This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

THE KINDERGARTEN PRINCIPLE

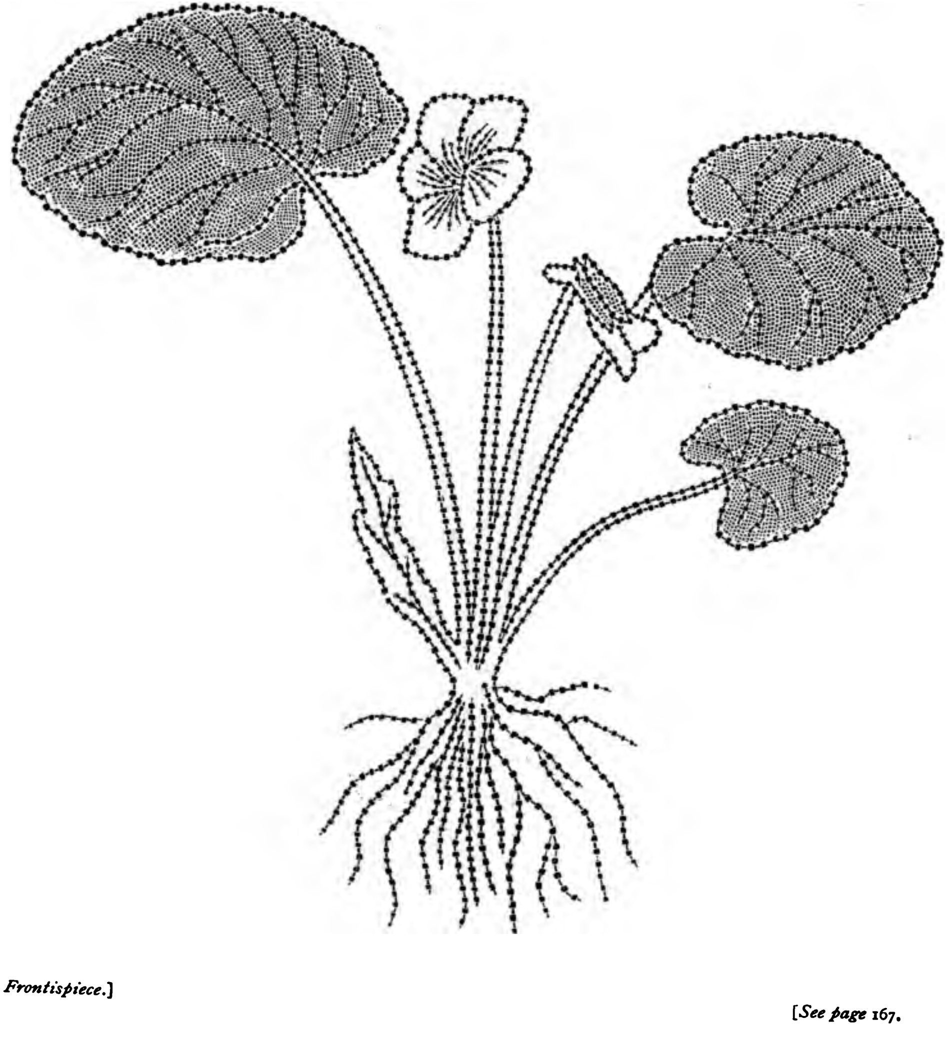
MARY J. LYSCHINSKA

SUPERINTENDENT UNDER THE SCHOOL BOARD FOR LONDON

600070090M

THE KINDERGARTEN PRINCIPLE

THE KINDERGARTEN PRINCIPLE



Frontispiece.]

[*See page* 167.

THE KINDERGARTEN PRINCIPLE

Its Educational Value and Chief Applications

By MARY J. LYSCHINSKA

SUPERINTENDENT OF METHOD IN INFANT SCHOOLS UNDER THE SCHOOL BOARD FOR LONDON

BIBLIOTHECA
NOV 80
BODLEIANA

LONDON
WM. ISBISTER, LIMITED
56, LUDGATE HILL
1880

[THE RIGHT OF TRANSLATION AND REPRODUCTION IS RESERVED.]

260 e. 63.

LONDON:
PRINTED BY VIRTUE AND CO., LIMITED,
CITY ROAD.

PREFACE.

THE exposition of Pestalozzi-Fröbelian principles contained in this book makes no claim to originality. It is the outcome of long association with one of Fröbel's family, Henrietta Schrader (*née* Breyman), of Berlin. Whilst under her tuition, and afterwards during the friendly intercourse of years, the writer became acquainted with the developments of the Kindergarten principle herein set forth. The writer wishes at the same time to acknowledge the special obligation she owes to Mr. J. Allanson Picton, of London, who has rendered her much help in adapting her materials to the circumstances of English education.

CONTENTS.

PAGE

PREFACE v

INTRODUCTORY REMARKS 1

PART I.

CHAP.

I. A GERMAN KINDERGARTEN 5

II. THE PLACE OF NATURE IN EARLY EDUCATION 30

III. THE CO-ORDINATION OF CERTAIN EDUCATIONAL PRACTICES . . 38

IV. THE TEACHING OF PESTALOZZI AND FRÖBEL 44

V. SOME OF THE DIFFICULTIES OF INTRODUCING THE KINDERGARTEN PRINCIPLE INTO INFANT SCHOOLS, AND SUGGESTIONS AS TO THEIR GRADUAL REMOVAL 47

PART II.

A FEW OCCUPATIONS EXPLAINED AND USED:—

- Paper-folding 64
- Mat-plaiting 88
- Stick-laying 103
- Drawing 120
- Pricking 167
- Sewing 172

INTRODUCTION.

THE educational public in England are still inclined to regard a long list of games and occupations as the chief addition which Frederick Fröbel has made to the cause of education. Doubtless a few of his leading theories have been expounded in our language, but they have not as yet much practical influence on the organization of Kindergartens and infant schools. Theory and practice stand aloof from one another; thought has not been fully wedded to fact. I cannot doubt that this state of things will be changed when once the sources of information are within the reach of a wider reading public in this country. Much would be effected if some of both Pestalozzi's and Fröbel's little-known writings were better studied. Meanwhile popular attention is mainly concerned with the various Kindergarten toys and games. To meet the demand, manuals on these have been multiplied amongst us, and it would seem almost useless to add another to their number, or to say what has been well said already.

To avoid repetition, therefore, a very few of the occupations have been illustrated in detail in this book, and much information purposely omitted here will be found elsewhere. The aim throughout in dealing with the occupations has been to prove *suggestive* rather than exhaustive on such a subject. There is a twofold view with which every mother or teacher will study the occupations. First, she will study them *as a student of principles*; secondly, *as an educator and a teacher* of children. In the latter capacity she will find it desirable to go over the ground once more with a view to arranging the subject-matter for the purposes of instruction, and she will consider the method of imparting it. It seems to me that manuals on the occupations, through a failure to keep in view the double position in which such a reader stands to the subject, are apt to waste the student's time, because they prescribe an amount of unmeaning work not in accordance with the educational purpose to be served.

Again, the subjects of the exercises are usually divided into three groups, viz. Objects or Forms of Utility, Forms of Beauty, and Geometrical or Numerical Exercises. It has sometimes been asserted that these correspond to the threefold aspect of mental faculty, and that in making the first the child's practical sense is cultivated, in making the second the æsthetic sense is aroused, whereas by the third group of exercises the intellectual powers are cultivated. I am afraid such quasi-philosophical theories cannot be made good, and are likely to bring discredit upon the more essential part of Fröbel's educational doctrine. Consider for a moment what is understood by the "Forms of Beauty" and how they are made. Designs, or patterns, are produced by taking certain elements and placing them at regular intervals round a given centre. These doubtless please the eye by their regularity; and symmetry is an element of the Beautiful. But the mental activity involved in these productions is *analytic*, there is the constant recognition of *wholes* and *parts*, and such an activity can only lead to industrial art. The sense of the Beautiful, having its root in the emotional side of mind, obeys the laws and exhibits the characteristics of Feeling in general, and cannot be brought under any such mechanical classification.

Still the exercises are capable of a threefold application, which has a basis in the variety of mental activity in children. When, for example, by my questions, I stimulate the child's curiosity to investigate a few primary facts of Form, say the nature of the surface, or of different lines, &c., the child is in the position of a *discoverer ;* the facts are there, and he by his efforts neither adds to nor modifies them. (Exercises in Group C may be used after this manner.)

When certain elements of Form are given to him on the other hand, and he combines these in a new way, according to fancy, another mental activity is predominant, that of the *inventor*. Here the child distinctly contributes something of his own in addition to what was already given. (Exercises in Group B may be used thus.) Or again, he is required to copy some natural form, and the chief activity is that of *imitation*. (Exercises in Group A may be used after this manner.) The mechanical reproduction of elaborate designs cannot be too strongly deprecated. Children exercise little ingenuity and no thought in copying the productions of another person's brain, and the attitude of mind induced by such exercises cannot but be hurtful.

But it is my object to ask readers to direct their attention beyond the mere use of the occupations and games, considered by themselves, to the more important application of the Fröbelian principle to the observation of natural phenomena, and to welcome with me the new insight we have thus obtained into the question, What place ought the observation of Nature to occupy in early education? Early education is conducted either within the family circle or without, in various institutions such as crèches, infant schools, &c. Fröbel added another, the Kindergarten. This latter has often degenerated, even in the country of its origin, into a place where children are pleasantly amused, folding paper, playing games, &c., and English people may be excused if some misconceptions concerning the aim and object of the institution are still dominant amongst them.

And yet the organization called a Kindergarten is not merely a poetic fancy, a pretty name. The very word tells us plainly that at least one thing was present to the author's mind, namely, that of using natural phenomena as a means of early education. Without this, the whole organization lacks a life-giving principle; its parts have but an accidental and loose connection, the occupations and games are not linked together by any vivifying thought, and the very distribution of rooms, the furniture, the garden—all these seem to want a purpose. On the other hand, in a Kindergarten where the observation of natural phenomena is made a prominent feature, we have a key to the whole organization, a basis for education and future instruction.

Such a Kindergarten, with the addition of a Transition Class, I shall briefly describe, as any exposition of the principles upon which they are conducted will appear in a clearer light after an illustration of the working has been given.

PART I.

CHAPTER I.

A GERMAN KINDERGARTEN.

A FEW years ago the writer visited a Kindergarten for the working poor in Friedrichstadt, a suburb of Berlin. It then consisted of the two divisions of the Kindergarten proper and of the Transition Class, altogether providing for the education of children from three to six years of age.* What struck me as especially worthy of notice was the *unity of plan* upon which the education during these three years was conducted. Each class represented a year of age. At three a child entered the lowest division. Here the work of the Kindergarten teacher was eminently that of a mother; yet with all the freedom of the nursery there was a thread of reason running through the day's proceedings. These were not desultory, but sustained by some central thought, which was generally taken from a conversational lesson over the picture-book, or else from the present circumstance, such as of some live pet which had to be cared for and fed.

The first quarter of an hour was generally devoted to a chat; but as the children were many, and the family type was upheld, the teacher took the children in relays of six or seven at a time, to look at one or two plates in Fröbel's "Mother's Book;" the rest were meanwhile building or stick-laying, or playing in the garden under the direction of an assistant.

---

* Under the management of an active committee of ladies and gentlemen this institution has extended the field of its operations considerably within the last three years. Under the title of "Vorschule für hauswirthschaftliche Thätigkeit nach Pestalozzi-Fröbel'schen Prinzipien," it carries on the education of older boys and girls, and has thus made an important step towards introducing the same principle of reform into general school education. The address of the institution is 16, Steinmetz-strasse, Berlin, W.

For example, a small number of children are seated round the knee of their motherly friend, who encourages them to talk freely on the experiences of the morning. Who brought Mary to the Kindergarten this morning? Who gave Annie that nice white pinafore? The recollection of the loved ones at home is stirred up, and every child contributes some little fact of its family history; each would like to tell that it has a dear mother, a father, a sister, or brother at home. This idea is seized and worked out by the motherly teacher. She inquires, relates, and finally promises to show them a picture of a family sitting together in the parlour. The picture of a home interior is shown. The heightened pleasure of the children may be read in their eager faces as they peer into the book and recognise the different members of the family in turn. After which the designs all round the central picture are looked at, and the children notice how there are father and mother hares in the long grass, accompanied by their little ones; how there is a pigeon family, a deer family, &c. The children return again to the central picture of the human family group, and finally, the disposition having been created, the finger game is introduced: "Let us look at our fingers; are they not like a little family too? See how happily they live together; they always help one another. Shall we learn a little song about the family of fingers to-day?" "Yes," the children wish to do so; and, imitating the action, they repeat the following words:—

"This is our mother, dear and good,
This is our father of merry mood,
This our big brother so strong and tall,
This our dear sister beloved of all,
This is the baby still tender and small;
And this the whole family we call.*
See, when together, how happy they be!
Loving and working, they ever agree."

As the building lesson comes round, the same idea of the family is carried out, and the children build a "parlour" or a "house" in which the happy family is to dwell. Then the "oven" is built, and sticks are required to light it, in order that the members of the household may enjoy the family meal. On another occasion the visit of a dog to the Kindergarten is the centre of interest for many days, and every occupation is in turn brought into connection with it. A trough is built for the dog to drink out of, a kennel is laid in the stick-laying lesson, and so on. In every instance there is some *centre of living interest* around which the little life of these children is made to revolve, and it is drawn from the occurrences of every day. Thus the aim in this division is to awaken *interest* in the nearest surroundings, and at the same time to enlist the active powers of children in *the same direction as their impressions.*

---

* See a translation of this in a book entitled "Child and Child-nature," translated from the German by Alice M. Christie. Published by Sonnenschein & Allen.

Let us trace how this method of introducing the children to life around them was continued with those from four to six years of age. These were occupied once or twice a week in gardening a plot of ground belonging to them. Here many of the plants which were to furnish subject-matter for their observation were sown, and carefully tended throughout the spring and summer. They also became practically acquainted with a few industrial processes, such as they could take part in. For instance, when "wheat" was being especially considered, the children enjoyed the fun of actually reaping the wheat they had helped to sow in spring, in the plot of ground common to all. They bound it in sheaves, and carried it in triumph into their schoolroom, where each child received a stalk or two with the full ear; and whilst sitting quietly round the table they held the stalks upright and close together, until the children could very nearly picture to themselves a corn-field which had taken root indoors. The Kindergärtnerin* then led them by a series of self-made experiences to an appreciation of such facts as—

1. The height of the stalk. (This was very simply and well brought out by a story being told of how the Kindergärtnerin had played at hide-and-seek with a little boy in a corn-field during the summer holidays.)

2. The hollowness of the stalk. (The children learnt this by blowing soap bubbles through the straw.)

---

* I keep the original word in the text. "Infant teacher" is but a cold translation of what is meant.

3. The presence of knots in the stalk. (This experience was likewise gained whilst blowing soap bubbles; some children having been allowed to break the straw in the spaces between the knots, they found they could not use them.)

4. The ear of corn hangs its head. Why? (This led to an examination of an empty and a full ear.)

5. The ear is a great house in which there are many rooms.

6. In each room there lives a single little grain.

7. Of what use is the grain? (They had sown it in the spring, they were now about to learn its use experimentally.)

Another day the corn was threshed in the garden, the children using a small flail in turn. The grain was gathered and separated from the chaff by some others. Part of the grain was reserved for seed, and a small quantity was ground by the children between stones.

Another day, flour was taken and pancakes were baked. The children, under the direction of an older person, had each something to do in the process, the older ones learning to beat the eggs and to stir the flour, whilst the younger ones ran on little errands. At last, the great moment having arrived, the company sat down to enjoy the feast. Meanwhile, the leading idea was carried through the various occupations somewhat in the following manner:—

The elder children were "pricking" on paper the ear of corn or the mill which ground the corn; the younger children only outlined the millstones. Again, a scythe was sewn in coloured silk or wool. When stick and ring laying was the order of the day, then the cart which carried the sacks of corn was represented, &c. The appropriate games were the "Farmer," the "Miller," the "Mill," &c.

Finally a story, or simple piece of poetry, summing up the children's experiences was spoken or sung to the Kindergärtnerin's accompaniment on the piano. A picture representing the subject from an *artistic point of view* (the "Sower," by L. Richter) was shown, and enjoyed as a *résumé* of the children's experiences during the past week or two. There was nothing in either the story or the poem which was foreign to their experience.

The list of objects brought by similar methods under the children's observation during the year was as follows :—

October	The first fire, or Cat and mouse.
November . . .	The apple, or The carpenter.
December . . .	The fir-tree, or Common ivy, evergreens.
January . . .	The house-sparrow, or Hare and rabbit.
February . . .	Ice, snow, water. Washing.
March	The fish.
April	The hen, or The violet.
May	The bee, or The cockchafer.
June	Caterpillar and butterfly, or The pigeon-house.
July	(Holidays.)
August	The frog and fly, or The cow.
September . . .	Corn, or The potato.

A choice of one object was made for each month, and all the children between four and six years started from the common ground of experience.

Let us follow the course pursued in a few of those instances. In the month of October the subject was

THE MOUSE.

What was to be the standpoint from which the animal was to be viewed by children? Man being the natural enemy of the mouse, was the fact of his vengeance to be brought forward prominently, or was it to be ignored? If touched upon, were feelings of triumph to be excited in children, as over a vanquished foe, or were their sympathies to be enlisted on the side of the animal which was thus cruelly deprived of liberty and life by an irresistible enemy? What was the ground which the Kindergärtnerin, or Mother, would be supposed to take up and maintain whilst interesting and occupying children with the object? The point of view is given in the following description. The precise words were not repeated to the children, but the impressions here summarised were more or less conveyed to them by means of the *acts* and *arrangements* throughout the whole time devoted to the special consideration of this animal. They were somewhat to the following effect. The mouse is a pretty little animal; it wins us by its neat appearance, its trim ways, its agility, its funny movements. At the same time it is a great nuisance in the household, stealing our cheese and preserves, gnawing holes through the wood of our cupboards and walls, destroying and rendering useless everything it reaches. 'Tis true, our little mouse did not wish to do us or our possessions any harm. When it troubles the kitchen-maid (or Mother) by nibbling her rasher of bacon, it is solely actuated by the desire to live and to save its little ones from starvation. When we find our best clothes nibbled and riddled through with holes, the little mouse only thought what a warm bed she would make with the stuff for her baby mice. Nevertheless, we cannot suffer all this damage to our property; the trap must be set and the mouse must be caught. But when we have the mouse we shall be good to it; we shall give it as much food to eat as it likes, it shall have the softest of beds to lie down upon, we shall enjoy all its pretty pranks and ways.

How the Plan was carried out.

I.

The noise is heard in the store cupboard where working material is kept. The monitors for the week find the paper for "paperfolding" nibbled around the edges, and useless. The material is brought out and examined by the children. Conjectures arise as to what the cause is (effects of gnawing on different materials; sound of gnawing).

II.

The trap is fetched by a child. The trap must be cleaned by the children (the reason for this, acute sense of smell); the children fetch soap and water and scrub the trap. The setting of the trap (food). Placing the trap (habitat). During all this time in conversation: reasons for catching the mouse, reasons why the mouse does this mischief (care for the young brood, their number, many mouths to feed).

III.

Another day the mouse is found in the trap. Attempts at taming the mouse (timidity, signs of fear). Feeding the mouse (food). Simple conversation upon its appearance. With the young ones the following points only: the mouse is small enough to be held in a child's hand; it has a grey fur coat on; it has a long tail; it looks at us with its bright black eyes; it hears the noise children make; its ears stand up; it has four neat little feet. With the Transition Class, in addition to the above: the whole body is covered with short, soft hair; limbs lighter shade; the head is round like an egg; the mouth and nose are pointed (muzzle); it has sharp, cutting teeth (effects previously noticed on different material); there are long hairs (feelers) sticking out on each side of the nose and mouth; the ears are round at the top, like a spoon; it has toes on its feet; it has claws at the end of the toes; it can climb up walls, it can jump, it can swim; its tail is as long as its body; it sometimes sits on its hind legs and on its tail; it washes its face with the fore paws; it cries, pipes, squeals.

IV.

A story is related in prose or verse. In it the characteristics previously observed are depicted; the relations, friends, and enemies to the mouse are brought in. This leads us to speak of the cat. The story is to lead up to the contemplation of the picture (see pictures illustrative of Hey's or Specter's Fables, published by Perthes in Gotha).

"LITTLE MOUSE.

"*Lady.* Wherefore dost thou, little mouse,
Steal the sugar in my house?
Mouse. Dearest lady, oh forgive,
I've four children where I live;
Very hungry still are they;
Let me have it, lady, pray.

"The lady looked on with friendly eyes
And said: 'Well, Mouse, you may keep your prize,'
For I am going, just like you,
To feed my child, who is hungry too.
So Mousie ran off—oh! with what speed;
And the lady went gaily her child to feed."
(See translation of "Hey's Rhymes" of Messrs. Dalziel Bros.)

V.

Occupations in connection with the above:—
Building.—A mouse-trap.
Sticklaying.—Ditto.
Modelling.—A mouse. (The Kindergärtnerin makes a model.)
Pricking.—A mouse.
Sewing.—Ditto.
Drawing.—Ditto (cardboard model).
Game.—Cat and mouse. "Oh, mousie dear!"

THE SPARROW.

The Point of View from which Children are to consider the Bird.

The sparrow is the constant companion of man. He is certainly often a forward and unbidden guest, and hence he well deserves the epithet of the "street arab" (Gassenbube) amongst birds. We shall feed him and laugh at his funny ways; he is but a bird after all, and cannot know any better. But he shall not take away our peas and strawberries. We give him plenty to eat, and therefore he has no excuse for stealing.

How the Plan was carried out.

I.

Feeding the sparrows from the window with the remains of lunch. Observations are made as to what the sparrow feeds upon, its mode of taking food (beak), its movements (wings, feet, tail). Expression (sounds of contentment, anger, enticement, the movement of the tail). The sparrow flies away. Imitation of the movements as gymnastic exercises.

II.

Where did the sparrow fly away to? (dwelling). A nest to be shown, with sparrows' eggs. The children provide themselves with bits of wool, thread, straw, which are laid outside. They watch the birds carrying these away.

III.

A walk, during which the children look out if they can see a bird's nest.

IV.

A story is told, in which most of the characteristics of the bird already touched upon are summed up.

V.

The picture from Fröbel's "Mother's Book" is shown. The following remark leads up to it:—

"There are other birds less noisy and forward than the sparrow. They build their nests in the garden, often close to the ground; they sing sweet songs in the hedges and trees. One of these is the hedge sparrow. Here is a picture of that dear little bird." Conversation on the subject of the figures in the picture.

TRANSITION CLASS (5 years).

I.

In addition to the above, these children are accustomed to answer questions directly put to them upon the subject, somewhat after the following plan:—

1. The children are encouraged to expand a little in conversation about the birds they have just been feeding. After a few minutes the teacher resumes the direction with a question like the following:—

Teacher. I wonder if sparrows chat, as we do, amongst themselves. What do you think, Anna?

And what do we call the sounds they make when they are having a quiet conversation?

What are the sounds like when they are quarrelling?

How did the sparrow move about to get at the crumbs we scattered?

How did he move from the ground to the top of the roof?

What does the sparrow hop with?

What does he fly with?

To what part of him are the wings fastened? (That part is called the trunk.)

Do you know where the sparrow goes to when it is dark and he wants to sleep?

Why does our sparrow fly sometimes to the street, to the greengrocer's, to the garden, to the trees, to the fields, during the day?

What does the sparrow eat?

Here the picture, the "Horse and Sparrow," from Hey and Specter's Fables, was produced. A little conversation took place on the subject of the picture. The class began to commit the verses to memory. After this a bird song was sung.

II.

Another time former questions were recapitulated, *more especially those to which the right answers were not immediately found;* for the children before dismissal were required to mark the questions to which they were to find answers from observations made out of school hours. In the next lesson these were asked for, and very generally obtained.

Teacher. You told me last time what the sparrow ate:

What does the sparrow eat with?

Has he teeth?

To what part of his body is the beak fastened?

Did you notice anything else on, or in, his beak?

Did you notice anything else on his head?

Does the sparrow see well? How do you know?

Do you think he can hear? What makes you think so?

When have you seen him move his tail?

How is it that he does not fall off the branches of the trees?

How many toes has he? What has he added to each toe?

Any point which the teacher knew had not been sufficiently observed by the children was recapitulated in the form of a question, to which the children were to try and find the right answer by the next lesson. The verses were now committed to memory. In the "pricking" exercise that afternoon the sparrow was the subject of the design.

III.

1. The questions requiring answers were recapitulated.

2. *Teacher.* On what part of the sparrow do we find these things: The eyes? The beak? The nostrils? The ears? To what part of the body are the wings, the legs, the tail fastened?

What is the name given to the part between the head and back? Under the chin? Under the body? &c. (The sparrow was worked in wool tinted the proper colours.)

ELEMENTARY CLASS (6½ years).

In addition to the above, the following points received attention in this class:—

1. The size (measurement of dead sparrow).

2. Care for the young; separate part taken by male and female sparrow.

3. Form and parts of the beak, wings, and claws.

4. Covering: principal differences in the feathers of the wing, tail, breast, and back.

THE POTATO.

In the beginning of October the children returned from their half-hour in the garden, remarking that their potato-bed looked "yellow and withered;" whereupon one or two were sent to the garden-cupboard to fetch basket and spade; and the Kindergärtnerin headed an eager little crowd to the garden, there to commence the operation long since discussed and planned by older heads, but to the children a sudden thought, a delightful surprise.

I.

Visiting the potato-bed; its appearance. Lifting the potatoes: the older person digs, the children help to lift the plant and to gather the potatoes into the basket. Return.

II.

Washing, peeling, cooking the potatoes. Observations on the appearance of the plant.

III.

Washing, peeling, grating the potato; making a potato pancake. Drying the potato meal.

IV.

Potato starch is obtained, this is utilised in pasting some of the children's paperwork.

V.

The potato story. The following was the one related:—

I.

"This is potato-digging day, and to-morrow we are to have potato dumpling for dinner. Hurrah!" shouted Harry and Fritz; and by way of adding additional emphasis to their words they set off to hop on one leg round the table, by which exercise they sent one another sprawling on the floor. At that moment the door opened and Louischen showing her face, Harry caught hold of her frock hoping to save himself. Of course down she went too, to keep the boys company; but they all got up again unhurt, laughing, and in the best of humours with themselves and all the world besides. Why? This was potato-digging day to be sure!

"What on earth is all this noise about?" their mother now was heard calling through the open door. "Why, I thought you boys were going to help me to pack the children's cart with the provisions for dinner. Make haste and do so, otherwise you will have to stay at home."

But nobody thought of anything so stupid as staying at home; everybody wanted to go with father and mother to the potato field. So a place was found for coffee, and butter, and bread, and milk in the children's cart, along with empty potato sacks, spades, and a basket. At length the procession began to move onwards.

About half a mile from the village the children's parents possessed a piece of ground. In the spring, Harry remembered, his father planted the potatoes, and later he had trenched them by digging up the earth in long ridges. But all that had been done months ago, and now the swallows had flown, the roses on the porch had faded, and every leaf was getting yellow. They were going to see what the potato had been doing in the earth all this time; father had told them the potatoes were ripe. So now they had arrived at the potato field. The first thing was to rest a little while; then the cart was unloaded, and the potato sacks, the spades, and pitchfork were taken out. The father took the pitchfork; the boys watched their father setting it in front of a large potato plant; he put his foot upon the fork and it sunk into the earth; the whole plant shook and trembled; he raised the fork full of earth and the potatoes upon it; their mother then came, and taking the plant by the stalk she pulled it right out of the earth, and held it up. Oh, wonder, what a sight! Numbers of beautiful large potatoes had grown to the bottom of the plant, below the earth; they were hanging to it now, as if on ropes, and other potatoes lay strewed on the ground round about.

"Now to work with a will!" shouted their father; and the boys scrambled to pick up the potatoes and fill the basket. As their father was very quick at lifting the potato plant, the children had hard work to keep up with him, gathering the potatoes as they came out of the ground. Soon the basket was filled, and this was carried to a sack into which all the potatoes were put.

After a time dinner was served under a tree, and they all had a rest. The coffee and bread and butter tasted so good, and the autumn sun sent his mild beams across the field to gladden them all round. Fritz once very nearly upset his mug full of coffee on to the ground, from a start he got when a hare bounded out from the grass at his feet, and the children shouted with glee as Master Bunnie was seen scampering across the potato field, and was lost to view on the edge of the wood beyond.

After dinner the work proceeded until the sun made signs of setting, when the children were instructed to put the potato stalks and withered leaves into one great heap. When the heap had grown to be quite high their father set fire to it, and the smoke rose in great clouds; then a flame broke out and blazed higher and higher, and the faces of the parents and children seemed all in a glow from the red glare it threw on all around. When the flames had at length died down, some potatoes were roasted in the glowing embers and eaten with salt and butter for supper.

Thus ended the delightful day of potato-digging; and the children, although still happy, were very tired. So the party returned home. Rest comes to the weary after a good hard day's toil, and all of the children were soon fast asleep in their beds.

II.

But the next day was "potato feast" day, and there were to be potato dumplings for dinner. The children were with their mother in the kitchen, and she allowed them to help her to cook the dumplings. How long it seemed to wait before they were ready! At last mother was seen turning them steaming into the large bowl, and taking the dish in her hand she headed the noisy procession to the parlour. Every one wanted to carry something: to Susette was allotted the porringer with the sauce; Fritz was deputed to carry the bread-loaf; and as there was nothing for little Louischen to carry, her mother stuck a potato upon the end of a fork and put it into her hand, saying, with a kiss—

"That is for you!"

"And is there nothing remaining for me to carry?" inquired Harry. "All right then, I shall be the band playing a tune to the words, 'To dinner! To dinner!'"

(The picture was here shown.)

THE HARE.

General Remarks—Point of View to be taken.

The animal has always played a prominent part in the fable, very likely because of his suggestive traits of character. His fear of man has earned for him the reputation of timidity. His swiftness and great cunning in baffling his pursuers are his chief means of defence. His flesh being considered a delicacy and his fur being useful, he is liable to be hunted down on all occasions. The long ears, large round eyes, and altogether wide-awake look, attract children, and he is chosen as a fit subject for many story-books. In the country he and his cousin the rabbit are well known to children as the thieves who rob the garden and who nip the tops off the sprouting vegetables and corn in the fields; hence man must defend himself against their ravages.

I.

A rabbit is procured and kept. It is fed by the children (food, hare-lip, incisors, mode of chewing). Movements of the animal (paws, length of hind limbs, fore paws). *Dwelling* (the rabbit burrows, the hare makes a hollow on the surface amongst the long grass, into which he presses his body closely). Length of the ears, the size of the eyes (the animal's means of defence).

II.

A story of the hare, cousin to the rabbit (this must bring out most of the characteristics of the animal already known).

III.

Occupations connected with the above:—

Drawing
Pricking } the animal.
Sewing

Games : "Bunnie in the long grass;" hare and hounds.

IV.

A dead hare is brought to show to the children. A story is told of a hare that did not take care. This leads up to the picture of the huntsman.

COMMON IVY.

The connection the object has with the lives of children and of human beings ; these impressions are to be conveyed to the children by the course of events.

When the trees stand stripped of their green dress, when the earth is wrapped in a white mantle of snow, when no flower is to be seen in the garden, then it is that the kind ivy delights us with the freshness of its green. It cannot bear to leave the old wall so ugly and grey; it throws its long arms round the crumbling stones, and clothes them in a garment of living green. Even in-doors we like to see our ivy plant; it does not ask for a place where it can be seen in the light of the sun; it is pleased with a shady corner, where it will cling to our pictures and encircle dear familiar faces with a framework of green leaves; all it asks for is air, moderate daylight, and cleanliness. It gives its very best to the poorest amongst us; it will flourish in and adorn a garret just as readily as a window in Mayfair. Would that the children of the poor learned through us to open their eyes to see the inexhaustible beauties which Nature spreads out before all her children, that they might learn to lay hold on such pleasures as are simple yet enduring.

The Course pursued with Children.

I.

A walk to the Botanical Gardens, which happened to be in the neighbourhood. The children are told to look for and to store any evergreens they find during their walk. With the permission of the gardener some box, fir twigs, ivy, moss, &c., are gathered, and are put into little baskets the children take for the purpose.

II.

The children decorate their respective class-rooms. Plates are filled with water and the moss, &c., is placed on them. The pictures, walls, &c., are decorated. (This is once done in the upper and twice in the lower division.)

III.

A neglected pot of ivy was observed and bought. The children observe its state and remove the cobwebs, sponge the leaves, renew the earth. A place is chosen for it in the room. (Conditions of health for the plant are thus discussed. Its appearance.)

IV.

A story was told. Subjects:—1. The apple-tree that had an ivy dress on in winter. 2. The neglected pot of ivy at the gardener's.

This leads up to the piece of poetry spoken by the Kindergärtnerin, and gradually remembered and recited by the children in both divisions:—

When the wind sounds dreary,
When the dead leaves fall;
Then the ivy's never weary
Creeping up the wall.

Shaking off the snow-flakes,
Laughing as they fall:
"You may bury *dead* leaves!"
Say those upon the wall.

Long ago the summer
Left us all alone;
Nothing fresh to look at
Save the cold grey stone.

Living leaves of ivy
Clinging to the wall,
Gladden with their green dress,
People big and small.

V.

Occupations in connection with the above:—
Building: a wall with ivy and moss.
Sand-work: a garden, evergreens planted.
Paperfolding: a basket to hold evergreens and moss.
Pricking: the ivy leaf.
Sewing: ditto (natural colouring).
Drawing: model of the ivy leaf.
Modelling: the ivy leaf.

WATER.

General View of the Part it plays in the Lives of Human Beings.

It must be considered as one of the most important of all agents in the life of man. As the great solvent it becomes the medium by which nutriment is conveyed to the body, besides being itself an element in building up the human frame and the great preserver of health. It is a constituent part of the atmosphere, the great regulator of climate. It moulds and changes the superficial aspect of the globe, it affords a dwelling-place to myriads of living things, it constitutes at once a link connecting nations and a boundary or line of defence. It yields a rich material for the artist's genius to work upon; it has served as a symbol of human life. Sometimes it appears as the most terrible opponent of man, as an untameable force threatening destruction to life and property. The various forms it assumes correspond to the manifold parts water may be said to play in the conduct of human affairs: between the tiny drop and the thunder-cloud, the murmuring stream and the boundless ocean, the ice crystal and the iceberg, we have endless degrees of difference. Water will ever be an object of interest and of thought. Its transcendent power requires man's energy and forethought in the highest degree if it is to be made useful to his purposes.

The Method with Children.

I.

The occasion was given for introducing the subject in this way. The children are thirsty, no water is at hand; the hands are dirty and the work is being soiled; or the doll's clothes must be washed, and what *should* we do if we had no water? Or what should we do without water to boil our potatoes? Nor would they grow in the garden. Indeed we may say our water helps us at every turn!

II.

A walk is taken. Snow and ice are brought home and preserved for the next day's washing of hands.

III.

This is washing day. Water is fetched, a fire is lighted, the water is boiled, the contents of the pot having been measured before boiling, the same is done afterwards. Cold and hot water are mixed in different degrees; the children put their hands into the tub. By some of them one or two articles of doll's clothing are washed; others hang them up to dry.

The following points were dwelt upon more fully in the *Transition Class.*

1. Water carries some things, such as our paper boats, a cube, a saucer, a piece of cork. Water does not carry a marble, nor a nail, nor a pebble. (A basin with water or a tub having been provided, every child was allowed to place something on the surface of the water and to watch the result.)

2. Water is easily spilled.

3. Water forms little drops. (This was shown by means of a greasy plate upon which water was poured; the children dipped their pencils into the water; they remembered the rain-drops on the window-pane the day before.)

4. Water makes two pieces of paper or wood stick together; when dry these pieces would not stick together.

5. Water always runs to the lowest place. (Two slates were balanced against one another obliquely; the children sprinkled a few drops of water from above, and the course of these was observed. A wooden platter had clay upon it; the children had been making "hills and valleys," and the surface of the clay was uneven; they were allowed to sprinkle water gradually upon it, and they observed how the water filled the deepest holes first.)

6. The top of the water is flat.

7. Sometimes it rises up, as through sugar, blotting-paper, a narrow tube.

8. Water dissolves salt and sugar; when the water goes away into the air, the sugar, salt, &c., remain behind in the saucer.

9. Water rises into the air as vapour.

IV.

Occupations in connection with the above:—

Drawing: the tub, a cardboard model.

Pricking: a few articles of doll's clothing.

Modelling: a tumbler or bucket for water.

Paperfolding: different boats are folded and the best is launched in a basin with water; a boat with a box for fish is also folded.

Games played: The water-mill, the wandering miller apprentice. The finger game of the fishes (younger children).

V.

The picture and story (in prose or verse). These were chosen with reference to the game.

SNOW AND ICE.

General Remarks.

These are associated in northern countries with corresponding recreations, such as skating, sleighing, sliding, &c. Ice is utilised in various ways: it is useful for preserving provisions, it is refreshing when mixed with food and drink in hot weather, it is invaluable in cases of fever, &c. Snow sometimes covers the earth in our latitude during several months of the year, thereby rendering important service to mankind; vegetation is protected from frost, which thus never penetrates deeply into the ground. Snow renders the landscape pleasing to the eye at a time when it is shorn of all other beauties. Meanwhile our lives seem to respond to the cycle of the seasons, for as in winter all Nature draws her power inwards, so the household retires around the fireside, all occupations and pleasures take place within doors, our domestic life, like all organic life, thus concentrates itself.

The Course pursued with Children.

I.

A walk is taken. Snow covers the ground, snow is falling, the children endeavour to catch the snowflakes and carry them back. Icicles are found hanging from the pump, the trees. They slide.

II.

Another day snow is gathered for snowballs. A snow man is made.

III.

A chat about the snow. During this time the children are the principal talkers, the person in charge merely throws in a word now and then to give a certain direction to the conversation.

In the Transition Class the experiences of the last two days are utilised more directly with a view to communicating a few simple facts, such as—

1. The comparative weight of snow (ice) and water. (A glass with snow and another of the same size with water are weighed.)

2. Snow crystals are observed on a slate. Ice flowers on the window panes.

3. Snow is melted and a comparison made between its bulk and quantity of water obtained.

IV.

The story or poem with reference to the subject is spoken by the teacher, then repeated, and the picture is shown.

V.

Occupations in connection with the above:—

Building and *paperfolding* (for the younger children). A house is built, the roof is folded, snow (made by tearing bits of paper) falls on the roof. *A stove* is built with bricks.

Stick-laying: stars like snow crystals; a sledge.

Modelling: a fir-tree.

Pricking and *sewing:* stars representing snow crystals, various patterns.

PREPARATION OF LESSONS.

Each object, before being treated with children, was studied by the Kindergärtnerin and her assistants, and for this purpose a meeting was arranged once a week for the consideration and preparation of the objects and their accessories. The following scheme was followed in gathering information upon a plant:—

A. External Structure.

1. Size. 2. Covering. 3. Chief parts. 4. Subdivisions of parts and their relative position.

B. Internal Structure and Development.

1. Structure of the seed. 2. Its composition. 3. Station. 4. Time of germination. 5. Process of germination (cells, structure and contents; cellular tissue; vascular tissue; circulation of juices; nutrition; root absorption; functions of leaves; extraordinary vessels and fluids). 6. Duration of growth, from the germ to the complete plant. 7. Propagation. 8. Age of plant.

C. Geographical Distribution.

D. Historical.

E. Cultivation.

1. General. 2. Diseases to which the plant is subject.

F. Its place in Domestic Economy.

G. Classification.

(Natural orders.)

In the case of an animal the information was gathered under the following heads:—

A. Description.

1. Size. 2. Covering. 3. Colour. 4. Description of parts: head; body; limbs.

B. Apparatus of Animal Life.

1. Movement (anatomy, general view; muscular system, general). 2. Sensation (nervous system, general; organs of sense; expression).

C. Apparatus of Organic Life.

1. Digestive system (habitat; food). 2. Circulation. 3. Respiration.

D. Reproduction.

1. Care of the young. 2. Support of the young. 3. Metamorphosis (insects).

E. Miscellaneous.

1. Geographical distribution. 2. Age attained. 3. Relations in which the animal stands to individuals of the same species; individuals of other species, or to other orders or classes; to plants; to man. 4. Means of defence against attack.

F. Historical.

G. Domestication, or Acclimatisation.

H. Classification.

1. Individual. 2. Species. 3. Family. 4. Order. 5. Class. 6. Sub-kingdom.

In order to obtain a complete general knowledge of the object to be treated, each teacher gathered information on one or two points more especially, after which the teachers met together for the interchange of such information.

In the case of a subject like "water," of course its most important physical and chemical properties were considered. Before "washing" was given as an employment to the children, those in charge had a general acquaintance with the anatomy and physiology of the human hand. It has been shown that such information was in no wise paraded before the children, and little importance was attached to the sum total of information imparted during a particular half-hour. The main use of accurate and extensive information is simply to *avoid* giving *incorrect*, or *misleading*, *impressions;* for we may err from truth in two ways—we may either make a wrong statement, or we may represent *some part* of a truth out of proportion to some other part, and thus disturb the mental picture we are creating in the child's mind.

This is a point upon which most authorities are now at one, and I shall not dwell further upon the necessity of adequate knowledge on the part of those who have the educational direction of children further than to refer to Rev. Henry Moseley's words in a report published in the Minutes of Council in 1853—54. He says—

"Had the teacher known more of the subject-matter of his lesson, it has been my constant observation that he would have been able to select from it things better adapted to the instruction of children and to place them in a simpler point of view. That he may be able to present his subject to the minds of the children in its most elementary forms, he must himself have gone to the root of it; that he may exhaust it of all that it is capable of yielding for the child's instruction, he must have compassed the whole of it. The cardinal defect of the oral lesson in elementary schools is an inadequate knowledge on the part of the teacher of that which he is teaching. If his knowledge of it had covered a larger surface, he would have selected matter better adapted to the instruction of the children. If he had comprehended it more fully, he would have made it plainer to them. If he had been more familiar with it, he would have spoken more to the point. I will endeavour to illustrate this by an example. A teacher proposing to give an oral lesson on coal, for instance, holds a piece of it up before his class, and having secured their attention, he probably asks them to which kingdom it belongs—animal, vegetable, or mineral—a question in no case of much importance, and to be answered, in the case of coal, doubtfully. Having, however, extracted that answer which he intended to get from the children, he induces them, by many ingenious devices, much circumlocution, and an extravagant expenditure of the time of the school, to say that it is a solid, that it is heavy, that it is opaque, that it is black, that it is friable, and that it is combustible. In such a lesson the teacher affords evidence of no other knowledge of the particular thing which is the subject of it than the children might be supposed to possess before the lesson began. He gives it easily because the form is the same for every lesson; the blanks having only to be differently filled up every time it is repeated. All that it is adapted for is to teach them the meanings of some unusual words, words useless to them because they apply to abstract ideas, and which, as the type of all such lessons is the same, he has probably often taught them before. He has shown some knowledge of words, but none of things. Of the particular thing called coal, as distinguished from any other thing, he knows nothing more than the child, but only of certain properties common to it and almost everything else, and of certain words, useless to poor children, which describe these qualities. . . . . . This tendency, from ignorance of things, to teach words only, runs in a notable manner through almost all the lessons on physical science which I have listened to."

CHAPTER II.

THE PLACE OF NATURE IN EARLY EDUCATION.

It may be well to consider here what are the points of general importance in the method of which illustrative details have been given. I shall point out one or two things which seem to me to be leading principles.

1. Notice the *place* which the observation of natural phenomena occupies in this scheme.

In the year 1879 a memorial was submitted by the School Board for London to the Committee of Council on Education with reference to the teaching of elementary science in Board Schools. A suggestion was made that elementary science should form a fifth "class subject" under sect. 19, c. i. of the Code, that a grant might be earned in respect of it, and that it might take its place alongside of grammar, geography, and the elements of history, as a most valuable, *although not compulsory*, part of ordinary school teaching. The gentlemen who promoted this movement doubtless had the lower classes of boys' and girls' schools in view. But how does the matter stand in infant schools, including children of Standard I.? Here the "object lesson" represents the elementary science of the upper departments, but it really forms no essential feature of the infant school, the whole business of this department being that of getting infants in all classes forward for the examination in reading, writing, and arithmetic. Now from the Pestalozzi-Fröbelian point of view we cannot, in the Infant School, rest satisfied with the modest share of attention claimed for the observation of Nature in the upper departments. Surely, if at any period of life, it is during the first years that immediate contact with living, growing things is of paramount importance; and in our plan we represent it not simply as "valuable," but as "compulsory." In fact, as has been noticed before, it gives what is too often wanting in Kindergartens, namely, unity of plan and coherence in their organization. All the occupations and games are illustrative of a central organic idea. In the Transition Class, following the Kindergarten proper, the exercises in language (spoken and written) are strictly co-ordinated with these lessons on natural objects. The reading books in the first stages are framed upon the children's experience, which is ever widening. It forms the germ from which all the various "subjects" are gradually differentiated as the school years advance. This store of experience is eagerly acquired by a little child, and it becomes to him an education of the will and the affections in the first instance, serving afterwards as a basis for his instruction.

We may ask, Is it natural, is it important, that children should be thus occupied with the constitution of things around them?

Our ideas are rapidly undergoing great modifications with regard to what is the meaning and probable scope which Nature has in human affairs. Underlying, as it does, all existences, drawing as we do from it all the highly wrought material products of civilised life, finding in the recognition of its higher uniformities an exercise worthy of the keenest intellects, the source of the artist's inspiration, many are even now ready to see in Nature's teachings the symbols of yet higher truth, most weighty in their ethical bearings. In the face of all these changes, is it strange to suppose that even in education Nature may wear a new aspect and may occupy a new position?

2. *The method* above described of introducing natural phenomena to the observation of young children requires a few words of exposition. The Fröbelian believes that the younger the child is, the more he is part and parcel with Nature—at one with her. The animal is so strong in him that he is born with a very great capacity for enjoyment of the sights and sounds and changes which Nature spreads out before him.* This sympathy with beasts and birds and

---

* See quotations, pp. 44 to 46.

flowers ought to be fostered and to receive direction. The object lesson, with its stereotyped number of heads ranged in unvarying order, is too artificial a method to attain the end desired, namely, that of inspiring young children with the love of Nature, giving them a habit of looking into her every-day marvels, a familiarity with her ways. The first thing to do is not so much to talk about the things, as to be *busy with* them ; as a part of their education, children must have opportunities given them of entering into a kind of compact with Nature to serve and be served by her. It is not the dry anatomy of Nature's facts but the personal relation in which the child finds himself to certain objects that first awakens his interest. For this reason the educational institution I have taken as a sample counted a plot of ground under cultivation, a few pet animals, a few kitchen utensils for the illustration of the simplest domestic processes as they occurred, amongst their indispensable educational apparatus. Of course it is not the fact of possessing them, but of weaving their use into the general scheme which constitutes the value of such means.

Home surroundings, too, gain in importance in our eyes in the education of the young as we proceed on this plan. There is so much to interest and to occupy, that we have only to select from our vast store. The practice has hitherto been rather to despise what is near, with a view to sending the infant mind abroad in search of marvels ; the mind, it is said, must rise above its immediate surroundings to the unseen.

The perusal of the current literature on object teaching, or a glance at the lists of object lessons often given in infant schools, gives a pretty good idea of the mental bill of fare often proposed for children under eight years of age. Here is a list of Object Lessons in the order in which they were given between Midsummer and Christmas in an infant school, which is a very fair specimen of its kind. Two lessons were given each week.

For Children of 3 *Years of Age.*

On Tuesday . .	Honey	1st week
„ Thursday .	Dog	
„ Tuesday . .	Pins	2nd week
„ Thursday .	Birds	
„ Tuesday . .	Apple	3rd week
„ Thursday .	Cat	
On Tuesday . .	Coal	4th week
„ Thursday .	Horse	
„ Tuesday . .	Mouse . .	5th week

Etc., Etc.

For Children of 5 *Years of Age.*

On Tuesday . .	Soda	1st week
„ Thursday .	Elephant	
„ Tuesday . .	Tea	2nd week
„ Thursday .	Pig	
„ Tuesday . .	Wax	3rd week
„ Thursday .	Cow	
„ Tuesday . .	Sugar	4th week
„ Thursday .	Spider	
On Tuesday . .	Potatoes	5th week
„ Thursday .	Sheep	
„ Tuesday . .	Salt	6th week
„ Thursday .	Mouse	
„ Tuesday . .	Bread	7th week
„ Thursday .	Camel	

Etc., Etc.

For Children of 6 *Years of Age.*

On Tuesday . .	Chalk	1st week
„ Thursday .	Squirrel	
„ Tuesday . .	Pins	2nd week
„ Thursday .	Ostrich	
„ Tuesday . .	Cotton	3rd week
„ Thursday .	Elephant	
„ Tuesday . .	Trees	4th week
„ Thursday .	Spider	
„ Tuesday . .	Onion	5th week
„ Thursday .	Rattlesnake	
„ Tuesday . .	Tea	6th week
„ Thursday .	Dog	
On Tuesday . .	Coal-mine	7th week
„ Thursday .	Tiger	
„ Tuesday . .	Candles	8th week
„ Thursday .	Rabbit	
„ Tuesday . .	Books	9th week
„ Thursday .	Fox	
„ Tuesday . .	Clothing	10th week
„ Thursday .	Fox	
„ Tuesday . .	Butter-making	11th week
„ Thursday .	Wolf	
„ Tuesday . .	Lighthouse	12th week
„ Thursday .	Giraffe	

For Children of the 1*st Standard.*

On Tuesday . .	Tea	1st week
„ Thursday .	Spiders	
„ Tuesday . .	Apple	2nd week
„ Thursday .	Hippopotamus	
„ Tuesday . .	Potato	3rd week
„ Thursday .	Cow	
„ Tuesday . .	Cotton	4th week
„ Thursday .	Duck	
„ Tuesday . .	Sugar	5th week
„ Thursday .	Rabbits	
„ Tuesday . .	Rice	6th week
„ Thursday .	Motions of the Earth	
On Tuesday . .	Sugar	7th week
„ Thursday .	Definitions referring to water	
„ Tuesday . .	Candles	8th week
„ Thursday .	Recapitulation of definitions	
„ Tuesday . .	Silver	9th week
„ Thursday .	Tiger	
„ Tuesday . .	Lead pencil	10th week
„ Thursday .	Definitions referring to land	

Etc., Etc.

Surely this list suggests great confidence in the omnivorous voracity of the infant mind. Carl Ritter, in his "Comparative Geography," says, "Wherever our home is, there lie all the materials for the study of the entire globe; the eye may be easily trained to see the greater in the less." The argument sometimes brought forward in favour of introducing children under six years to the natural products of foreign countries is, that they see varieties of animals and collections of every kind at the Zoological Gardens, in museums, &c. But these collections are the outcome of our civilisation; they are not meant to meet the educational wants of infants, and in these first years may be considered as little useful in securing the basis for early education. It has been seriously proposed to lecture to infants, and illustrate natural science by the aid of the microscope!

There is a real source of danger to early education in the facilities enjoyed in large cities for the extension of knowledge through the accumulation of the world's wealth; and the circumstances of modern life may become inimical to the due unfolding of power if we bring up the child to pluck the flower of civilised life before he has, *in a certain sense*, known a simpler stage of existence. If Fröbel's often-quoted maxim be true, that the development of the individual is parallel to that of the race, then must we not consider the young child somewhat in the light of primitive man as he was first placed by the Creator on this earth, and must not the infant, by the elementary exercise of his powers, rise to take possession of the inheritance awaiting him? One of the simplest conditions, the possession of sufficient ground for educational purposes, is already a question of insuperable difficulty; and it will only be reconquered for our children when the arguments of a social economist like Octavia Hill or Edward Denison are felt to point in the same direction as those of the educationist. The appeal for "Space for the People," so eloquently made on economical grounds, must now be translated into the language of the educationist.

These observations were called forth in considering the *selection* of natural objects to be put before children. Another point to be referred to is the *number* of objects to be presented to children within a given time. It will be noticed in the above list that the consideration of each object (with its accessories) occupied the space of from three weeks to one month, with the older children (four to six years) two lessons being set apart every week for this subject. So far from observing weariness as the result of this limitation, much interest and concentration of mind seemed to be engendered.

Now if this really be the case, the fact seems to point to another principle of general importance in the method of treatment. The Kindergärtnerin appeared to proceed upon the assumption that a young child is not naturally the fickle butterfly being he is sometimes represented to be; on the contrary, that he desires to recognise unity in diversity, and that an object interests him in proportion as he is allowed time to become acquainted with it, with the changes that come over it, with its relations to himself and to other beings he knows. A young child is of all other beings constitutionally the most apt to receive the first great truth stamped upon the face of Nature, namely, that there is not such a thing as an isolated existence. The potato that was planted and reaped by the children is not dismissed after a cursory glance at its appearance. It has to be peeled and boiled and eaten; on yet another occasion it has to yield the starch for pasting the children's work. Again it yields subject-matter for a picture and a story, and the literary lessons are co-ordinated with these experiences. Finally, the various occupations of pricking, modelling, drawing, sewing, &c., are brought to bear upon the same subject, or on one intimately connected. Remembering all this, we readily perceive the *cumulative power* of such a method of treatment.

A few general considerations which serve as guides in the selection of subjects, according to Fröbelian principles, may be shortly stated. They are—

1. The season of the year.
2. Local conditions (such as the pursuits of the people in the neighbourhood).
3. Social customs.

In accordance with the first condition, it is evident that such plants as are typical of the season would be chosen. In order to carry out this effectually, the head of a Fröbelian institution has received in her professional training a practical acquaintance with the simplest gardening operations.

How local circumstances and social customs influence the choice of subjects in a Kindergarten may be illustrated by the case of a people's Kindergarten in a country district in Germany. Upon inquiry as to the reason for choosing "the pig" as an object of the children's contemplation, more especially as it was the rule to dwell upon the nobler and human qualities of the brute creation, I was told the following facts. The population of that district consisted of families each of which owned and cultivated a small strip of ground of the size, and yielding the produce, of a market garden. They lived in a cottage built on the land and likewise owned by themselves; but as their earnings from the sale of the produce did not suffice for the entire support of the family, each possessed a valuable addition, namely, a pig. At a particular season of the year the pig was killed, the flesh was cured, and prepared in a variety of ways. During that time it was customary amongst the people to hold a "pork feast" at every house, when pork was served up fresh, salted, made into sausages, &c. The remainder of the feast was hung up in the chimney smoke and served as the chief article of consumption for the family during the winter months. Was it wonderful, then, that the "pig" should have played a prominent part in the Kindergarten of that district—that the story of the "Lost Pig" should have affected the children to tears, that its recovery was an occasion of lively rejoicing? Under the circumstances, that really meant to those poor children, family peace and comfort *versus* semi-starvation.

The Kindergarten for the people in the suburbs of a large town has infinitely greater difficulty in establishing any kind of bonds of true fellowship and sympathy with the lives of the parents and children. Still in Berlin such links have been established, and have an influence on the selection of subjects in the Kindergarten itself. Above everything, in dealing with children from such different homes and brought up under such a variety of circumstances, the possession of a plot of ground under cultivation, a few animals, a few domestic utensils, &c., has been found a necessity, in order to secure a common and uniform basis of experience for the education and instruction given in the institution.

CHAPTER III.

THE CO-ORDINATION OF CERTAIN EDUCATIONAL PRACTICES.

THE educational practices here alluded to are: the picture, story, poem, occupations, and games or dramatic representation of the dominant idea. These properly belong to another domain, not that of Nature, but of Art, and no doubt much might be said upon this most difficult problem of cultivating a love of the Beautiful in early education. I shall confine my remarks to those practical points bearing upon the subject immediately before us.

THE PICTURE.

The improvements of late years have no doubt been very great in pictorial illustration considered as a means of culture generally. Our family picture books, the popular illustrated periodicals for the diffusion of cheap knowledge, the pictures of the animal world adorning the walls of schools and nurseries, have greatly cultivated our taste and raised our standard. But our progress must not blind us to the fact that from an educational point of view something remains to be attained—that no perfection in mechanical processes can dispense with the ever-jealous control which educational requirements ought to exercise in the choice of subjects and in the mode of treatment, when pictorial illustration is addressed to the young. Let me cite as an instance the illustrations of the animal world now so generally adopted in infant schools. They are no doubt perfect of their kind. Drawn on a large scale, the animal stands out in clear and bold outline; the colouring is so like the real thing as almost to deceive the eye. What more could we have? Just this—a more sympathetic adaptation to the primary educational wants of a young child. It is not a question of the *degree* but of the *kind* of excellency. The purpose of instruction is so evident; the drawings are entirely dominated by the scientific intention; and *they are cold.* No doubt there is a justification for such pictures. When we want to apprehend the object from a purely intellectual point of view we isolate it from all disturbing accidents of place or time; but at the same time we snap the bond of life asunder. The suggestive incidents of surroundings, the links which bind that object to all others, *the artistic truth* of the picture, are absent; and can we reconcile ourselves to such a blank in the training of early years? Surely truth has many aspects, and the scientific must here be carefully supplemented by the artistic view of Nature. Fröbel's "Mother's Picture Book," notwithstanding the shortcomings in the execution of the drawings, may be fairly said to have opened up a new direction in this respect. When this is once understood, not as a *book*, but as the embodiment of a principle, we shall have little difficulty in giving pictorial illustration its true place in infant training.

Alongside of those pictures more especially designed for conveying a *correct* impression, others are shown of the object from an artistic point of view. Thus, for example, at the end of the series of lessons on "Wheat," the children sat for a few minutes in quiet contemplation of Ludwig Richter's woodcut of the "Sower." The smile that lit up the countenances of the children, the evident enjoyment they had in the simple beauty of the drawing as a whole, was an end in itself; and no questions from the teacher as to parts and qualities and uses intruded themselves upon the attention, or checked the momentary abandonment to pleasurable excitement.

THE NARRATIVE OR POEM.

It is customary to consider the narrative as the great vehicle for moral truth; and various moral conclusions, if not interspersed throughout, are appended in one or two sentences at the end. Yet many people who are convinced of the paramount importance of moral and religious influences, and of the impossibility of ignoring them for a moment in early training, are nevertheless not convinced that such influences are best invoked by direct didactic utterances. In connection with the subject before us, the poem or narrative might be considered more exclusively as an appropriate opportunity for imparting *intellectual* truths concerning the animal, or other object, in question. Now it is neither as a vehicle for the inculcation of moral nor of intellectual truth purely that we are considering the poem or prose narrative, but from a *literary* point of view, and with some *singleness of purpose.* It is not a contradiction of terms to say that the ends above mentioned are sometimes attained without our aiming at them directly in telling a story. Let the following points be more immediately kept in view in selecting or composing the stories we relate in connection with the natural objects observed. With regard to the *subject-matter*:—

1. *Simplicity* in the framework or plot. The motives must be such as are on a level with the understanding of the children addressed. The incidents and facts must answer to (although they extend) the conceptions which the children addressed bring with them.

2. *Proportion.*—The incidents must not branch out and away from the main flow of action; they must only be introduced in as far as they help towards the development of the main purpose.

3. *Truth.*—The incidents must be either such as have actually occurred, or such as might in the nature of things have occurred. The fairy tale is an exception to this rule; it demands discrimination in its use, and, in my opinion, only those having a certain moral unity of purpose underlying the fictitious incidents ought to be given to children. There is such a thing as exciting the imagination to no justifiable purpose.

With regard to the outward form:—

1. The language must be *simple*, *i.e.* we must avoid making use of long and involved sentences. With very young children it is necessary to avoid the use of relative or personal pronouns, or of words expressing generalities. Thus instead of saying the child was *good*, it would be better to name the special form which goodness assumed in that case.

2. The form of *dialogue* should be assumed whenever it is possible.

3. *Analogy* is delightful to children, and ought to be largely used when this can be done without its appearing forced.

4. *Gestures*, when not exaggerated, heighten the effect of the narrator's words.

It is the habit in the Kindergarten described above to select the poem, like the picture and other accessories, before the object has been shown to the children at all; thus the whole series of lessons lies sketched out before the mind's eye of the teacher. This will appear necessary when it is explained that the poem is never actually learned by rote, although, in acting out the idea, the children find it fixed on their memories without effort. A mechanical effort of memory has not been found necessary when the incidents or sentiments which have found their expression in verse have previously become matters of experience. The children had little difficulty in assimilating the language of the poet after they had gone through his experience. On the other hand, care was taken to avoid such compositions as were either descriptive of scenes, generalities of thought, or emotions, foreign to the children's experience.

THE GAME, OR DRAMATIC REPRESENTATION OF A LEADING IDEA.

The reason above given for considering the poem and narrative rather from a literary than from a directly didactic point of view holds good in the case of the treatment of the Kindergarten game. No greater misunderstanding of Fröbel's meaning has occurred than on this point, and no greater educational mistake could be made than that of burdening the free and happily conceived expressions of joyous childhood with ulterior purposes and ends.

It is one thing to start with the idea of teaching some fact of natural history *by means of* the game, and quite another thing altogether to bring the game into organic connection with the dominant interest, the idea uppermost in the minds of the little community.

In the one case we have a languishing pantomime into which we galvanize life with more or less success; in the other case we have to deal with little minds already fully fructified and invigorated by the contact with actualities, and ready to send forth behests to the body in answer to the rising images within. The game then becomes a natural outlet of feeling instead of a form imposed from without. Entirely dissenting from the view often taken of the games, I think anything like "improving the occasion" is to be avoided; and I should sooner accept the description of some objectors who find in them nothing but a "regular romp." A person with tact and natural feeling will avoid extremes, and, without making the game a *lesson*, she will nevertheless influence it *indirectly* by the rhythmical and musical exercises which are avowedly practised with a view to obtaining order and precision of movement. In the act of playing the game let the older person be a child with children, unhampered by having ulterior ends in view, and let her flee the very appearance of design, so justly censured by all naturally minded people who object to the idea of children being *taught how to play*.

THE OCCUPATIONS CONCERNED WITH NATURAL OBJECTS.

As before stated, the object engaging the attention of the children for the time being is represented in clay, paper, wood, &c., whenever it is possible to do so. When the object is in itself beyond the children's powers of imitation, or otherwise impracticable, another closely associated with it is substituted; for example, the mouse may be variously represented in a pricking, sewing, drawing lesson, but in sticklaying work the trap would be a more suitable object.

With young children it is of course absurd to lay great stress upon perfection in the imitation of the object. The production of immature beings must be imperfect, and children's work that has a certain "finish" about it, if it is not a more or less abortive attempt to give expression to what was rising in the mind, ought to be looked upon with extreme distrust. It has often been said that Fröbel's method cultivates more than any other the artistic power. There is some danger of misapprehension on this subject. It does not mean that every child going to a Kindergarten can possibly become an artist in execution. If in any sense the artistic faculty is to be cultivated, it is only to be done indirectly by the removal of artificial barriers to the pleasure which childhood takes in the simplest and commonest of Nature's beauties; in heightening such enjoyment by fixing the attention and concentrating the force of the will in the same direction; and, lastly, by raising the object thus contemplated in the actual to the ideal world, by means of a good picture or a piece of real literature.

The method which lays such stress upon the productive activities seems to bring along with it corresponding temptations to parents, in the way of "showing off" their children. Hitherto children were thought to be non-producers until they arrived at the age of maturity. Suddenly the idea of work and the right kind of work for children has been discovered, and there is a certain vulgarity of mind ever ready to grasp at tangible "results." Even children are now to produce something which has its market price, and this vulgarity is not confined to the "code."

CHAPTER IV.

TEACHING OF PESTALOZZI AND FRÖBEL.

I SHALL here cite a few passages from the works both of Pestalozzi and Fröbel which seem to bear directly upon the subject of introducing young children to communion with Nature. Pestalozzi says in "Leonard and Gertrude," Part III.,* Seiffarth's edition, 1869—

> 1. "Neither book, nor any product of human skill, but *life*† itself, yields the basis for all education and instruction."
>
> "She [Gertrude] drew her children's attention to various natural phenomena as these occurred in the fulfilment of domestic duties, whether in the kitchen or parlour, in the field, the garden, or the woods. *Her aim in all this was not to impart knowledge, but to awaken sympathy with objects in as far as they were interwoven with the incidents, duties, joys, and wants of the children's existence.*† Whilst helping her [their mother] in the preparation of the family meal, whilst engaged in carrying wood, in lighting the fire, and in fetching water, they were forced, by the very nature of their occupations, to observe many of the properties of water, the effects of the atmosphere, smoke, wind; they noticed the changes in water when motionless in a tub or when flowing from a pump; they observed the transformations of water into ice, snow, rain, hail, sleet; they registered its action upon salt and upon a flame; were aware that charcoal and ash were obtained from wood, and that the latter was subject to changes termed decay. All this they learned, not so much through the medium of words, but through having their attention fixed upon the objects and upon the changes which took place" [as they busied themselves with the things].

Fröbel, who was in a sense the pupil and disciple of Pestalozzi, takes up and works out the same fundamental idea. In his work on the "Education of Man,"‡ he says:—

---

* The third part of "Leonard and Gertrude," published in 1785.

† The italics are my own.

‡ The "Education of Man," published in 1826. The latest edition appeared in 1863, under the auspices of Dr. Wichard Lange of Hamburg.

"Is there a solitary blossom, or outcome, of human thought, feeling, or volition, that does not send its taproot deep down into the subsoil of early years?"—(P. 54, paragraph 39.)

"Every trade, whatsoever the parents' calling be, furnishes a starting point to the child from whence he must work his way outwards towards the acquisition of any department of human knowledge."—(P. 58, paragraph 40.)

"Numberless perceptions regarding the constitution of things around might thus be garnered in the mind; such experience can only be supplied by the whole time and apparatus of school at an enormous cost afterwards, and perhaps it never can be supplied. So much is lost by neglecting the educational opportunities of home life."—(As above.)

"A little child knows intuitively that the conditions of its mental well-being are bound up in the avocations of its parents; hence it follows wherever they go; where they remain, it remains; it hovers about and asks questions. . . . . Parents, do not send it away in a fit of impatience, ... neither answer its questions directly. . . . . It is, no doubt, easier to listen to the statement of another than to formulate one for one's self. But the quarter of a self-found answer is of infinitely greater value to your child than one half understood from you. *Only secure to your child the conditions under which the answer is to be found.*" *—(As above.)

"How eagerly does the boy or girl take part in the labours of father and mother, not in the recreative or trifling activities of life, but in those demanding concentration and exertion! But it is just at such a time that it behoves parents to be careful; for by one look, one word, they may crush the instinct of activity, the constructive faculty, for a lengthened period of time. Parents, I beseech you not to refuse your children's proffered help because it is childish, useless, or even obstructive. Think of the surcharge of energy pent up in the being of a little child thus cast upon his own resources, knowing not in what direction this power is to expend itself! The child is a burden to itself; peevishness and listlessness are the result."—(P. 68, paragraph 49.)

"If you ever count upon receiving help at your children's hands, take early heed to cherish the desire for activity, even at the cost of some self-control and self-sacrifice."—(P. 69, paragraph 49.)

"It is of the utmost importance that children should acquire the habit of cultivating a plot of ground of their own, long before the period of school life begins, for this reason: *Nowhere, as in the vegetable world, can his action be so clearly traced by him, entering in as a link in the chain of cause and effect. The effects are no less due to the intervention of his will than to the sequence of Nature.*" * —(P. 75, paragraph 49.)

"An instinctive yearning drives a child to busy himself with natural objects; but this longing is not only neglected, but deliberately frustrated from the beginning. This instinct does not rest satisfied with apprehension of the facts of Nature, nor of the secondary principles which govern these; its root lies far deeper. Stripped of all disguises, it is the eternal search made by man after the first, great, personal cause—the Godhead."—(P. 87, paragraph 55.)

---

* The italics are my own.

"How simple, how infinitely simpler than we at all imagine, are the sources and means of human well-being! All the conditions of human happiness lie at the door of each one of us, and we are blind. We may see them, but we do not heed them; too simple by far, too easy of application to attract our notice, they are held in utter contempt. We send afar off in search of help, and we know not that the educational remedy can only come from ourselves. Hence it is that a whole fortune does not suffice to restore a lost inheritance to our children, nor to make good the deficiencies in after life, which never would have existed if we had possessed greater insight into the wants of early childhood."*—(P. 36, paragraph 31.)

---

* In the passages from the "Education of Man" the writer has been compelled sometimes to give a paraphrase rather than a verbal translation of the passage, in order to preserve the author's meaning.

CHAPTER V.

SOME OF THE DIFFICULTIES OF INTRODUCING THE KINDERGARTEN PRINCIPLE INTO THE INFANT SCHOOL.

THE great obstacle to remodelling our infant schools is said to be the requirements of the Education Code at the age of seven years.

My experience of infant schools leads me to accept this assertion only with very great qualifications. Were the pressure of the Government requirements removed to-morrow, we should still find many obstacles in the way of introducing the new principles of infant training in a wholesale way into the national education system of this country. Had we to do with rules or prescriptions rather than with principles, we might hope to conquer a greater surface in a comparatively short time. I repeat that I do not altogether see that the educational law is so inimical to any effort tending to broaden the basis of education as some supporters of the new education represent it to be. It must be conceded as right and necessary that the public should demand simple and clearly defined results at the hands of those whom it places in the responsible position of educators of the people. Were the test applied at eight years instead of at seven, the most enthusiastic supporter of Pestalozzi-Fröbelian principles could not say that the Standard I. requirements cramped the infant in the development of his powers.

In as far as the Code affects infant schools the severity lies rather *in the spirit of its interpretation* than in the letter. It is the meaning which educational committees, inspectors, and teachers combined give to the law, which requires revision from time to time at the hands of the community at large.

There are no sub-committees of school boards nor of the Education Department especially appointed to consider the wants and capabilities of children between 3 and 7 years; and it is but natural that H.M. Inspectors, under the weight of heterogeneous responsibilities, should consider the infant school important only in as far as the success of the upper departments depends upon it. This is no doubt *one* aspect of the question; but, from the fact that no other point of view is ever adopted, the one becomes unduly magnified into the sole aim of the existence of the infant school. As an example of the prevailing view taken of infant schools, I give here a few sentences referring to them, to be found in the general reports of some of H.M. Inspectors. The italics in all cases are my own. Thus, in the year 1876, Mr. Du Port says—

> "I have looked carefully into the question of infant schools and their practical value. . . . . I rejoice to report that very carefully prepared statistics show that the elementary work of the children of Standard I. in schools fed by an infant school is vastly superior to the work and worth of the same junior standard in schools where the infants are left as a mere appended class of the senior school. My statistical record tells me that of schools fed from an infant school nearly 88 per cent. had a Standard I. up to or above the mark 'fair,' whereas in schools lacking an organized infants' department only 64 per cent. reached, or surpassed, that mark in their first standard. . . . . *Thus happily our admirable infant school system exists by no means in vain.*"

Another gentleman especially interested in infant schools, Mr. Le Page Renouf, says, in 1877—

> "The infant schools are very generally in a satisfactory condition. *They are so important towards the success of the upper departments* that I have hitherto made it a point to examine all the children myself under Standard I. *All the children above six years of age are examined according to the old 1st Standard.*"

Again, the Rev. D. J. Stewart says, in 1877, after giving some statistics with reference to the passes in elementary subjects—

> "The figures which refer to schools of infants do not deserve much consideration, because in many of these schools there are no children presented for any specified examination, and again because those children who are presented *have nothing to do but the easy work of Standard I.* With respect to the children whose names appear on the schedules merely as claimants for grants for attendance,* it has struck me that *their attainments might be advantageously raised*

---

* Children who are under seven years at the date of inspection.

without putting any undue pressure upon them; there is a tendency to give these schools a good deal of the character of nurseries." . . . .

Again, the senior assistant to Mr. Scoltock, H.M. Inspector for the Birmingham district, writes in 1877—

"With regard to the infant schools, a very marked improvement has been made in respect of organization and instruction. . . . . It is by no means a rare thing now to find the first class to be one of the largest divisions in the school, and the number of children learning their letters, instead of forming 50 or 60 per cent. of the whole, seldom exceeds 25 per cent., and in some cases not even 20 per cent. . . . . *The progress in instruction has been equally great.* The children in large infant schools are divided into six or seven classes; those in the lowest are learning their letters, those in the next two are reading small words from cards, the remaining ones, as a rule, reading books of varied difficulty. *It is not uncommon to find the third class reading the same book as was used but a few years ago in the first, whereas the first class is often able to read fluently in Standard I. and sometimes in Standard II. books, to transcribe from a card or book, and to work sums in addition."*

Observe here, first, that the primary and only value of the infant school lies in the fact that the work of the upper schools is begun sooner; secondly, that the value of the infant school increases from year to year as the same *kind* of work and the same *degree* of excellence in that work is required and obtained from a younger class than the one which formerly produced it. The fact that the same work *is now obtained* from younger children should never be cited as an argument in favour of exacting it; it may rather be our duty deliberately to refrain from pursuing such a course; and the only sure guide for our practice must be a thorough-going return to first principles of early education, and a careful and ever-recurring scrutiny of the measures founded upon these.

The prevalent view taken of the nature and functions of the infant school may be easily understood by the general reader from the above remarks and quotations. It is not considered as an institution in itself, containing greater differences of mental development than the girls' or boys' schools can possibly show. It is foreseen that children of a certain age will be asked certain questions. Why then, it is argued, shall we not take time by the forelock and begin to teach them their prescribed tasks a little sooner? Thus the infant school practically comes to be nothing more than the grand means for *gaining time for rehearsal.* The tasks by reiteration must become a second nature to the children when they are legally called upon to repeat them.

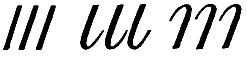
It has often been asserted that the teacher, being directly responsible for the management of her school, is at the same time unfettered in the method she adopts to gain her end. If such were the case, the freedom of choice would be taken advantage of during the three or four years which a little child spends in the infant school without legally being a subject to be tested. Surely, were the above assertion true, the years between three and six would be considered as a precious seed-time, a time of comparative retirement, during which the teacher of the present day, if she is an educative influence at all, would gladly scrutinise her own methods, anxiously seek a psychical basis in child-nature for her measures. But, alas! it is far otherwise in fact. Even as far down as the profundities of the "baby-room" she is fettered by standards,* and she is somewhat

---

* The following is a *Syllabus given for the examination of non-standard children in an infant school;* the author of it is considered one of the "least exacting" inspectors in regard to infant school "subjects."

3—4 *Years.*

Reading.—Know the alphabet.
Writing.—Write elements with attention to lines.



Arithmetic.—Count.

4—5 *Years.*

R.—Words of three letters regularly formed. Know powers of letters, and be able to change of initial letter.

f-an	p-et	-on	f-un
p-	s-		b-
r-	w-		r-
t-	b-		s-
v-	n-		t-

W.—To write *small* letters from a copy with attention to lines.
A.—To count.
To be able to add 1: 3 + 1, 2 + 1, 7 + 1, 6 + 1.
To simple calculations.

5—6 *Years.*

R.—To read a book of monosyllables.

in the position of the gardener a week before the flower-show, fearful lest the flower and fruition expected should appear one day sooner or later than appointed by order.

Practically, then, although the question of the infant school is one pre-eminently of method, the infant teacher is not at liberty to dispose of these years as she thinks fit in the event of her opinion differing from the current interpretation of the law. There is, first, the alphabet, the pot-hook, counting, needle-threading and unthreading stage; then the stage of syllable reading, sums on the slate, and hemming. A child of five and six years is supposed to have travelled over a certain ground, a certain well-worn track, with milestones to mark and measure his progress. Were he to reach the goal without having passed through these various stages in the prescribed order, it is to be feared that the verdict would go against the teacher. I do not for a moment wish to insinuate that the *absence* of all knowledge in the compulsory subjects is a guarantee of excellence in an infant school. I shall cite one or two instances, however, which show how a hard legal mode of estimating results neutralises a teacher's efforts to raise the educational value of infant school work. In one case a class was selected upon which to try the following experiment. Instead of making the object-teaching subservient to the reading book, and choosing the objects *in the order in which they are presented in the book,* the teacher endeavoured to follow the order which she believed was imposed by Nature. Accordingly, more than *one* lesson was deemed necessary for an object. The object was selected with reference to the season of the year, &c.* The children had lessons on a bird, and during that

---

W.—Alphabet, small and caps (attention to lines), either from memory or from dictation.
To write Nos. up to 20.
A.—To add and subtract Nos. up to 10.
2 + 2 + 2. 2, 4, 6, 8, 10, 12. 1 + 2 + 2. 1, 3, 5, 7, 9.
Count *down*—
(Variety.)

In another infant school where the standard in "reading" is very much higher throughout, the "babies" add to their usual accomplishments that of reading the following words from the blackboard, printed in small type: *bitter, hotter, butter, potato, monster.*

* See page 35 for chief rules in the selection of objects.

time their reading lessons treated of the same subject. For this purpose the teacher was obliged to select lessons in different parts of the book. The children met with new words, which were, of course, read with less fluency. Still they read, on the whole, with increased interest and intelligence, and their minds were evidently occupied with the subject, and images were called forth in answer to the word symbols. But the Inspector was in the habit of inquiring as to the *number of pages* that had been read, and it was evident that to read up and down in the book would be a decided disadvantage in the hour of examination. The plan, although interesting as an experiment, coinciding with the head mistress's convictions, had to be abandoned.

Again, in another case, a class of children had been taught to recognise *whole* words, then the syllables in that word, before they knew the letters contained. But H.M. Inspector required letters, and nothing but letters. These children knew in a sense much more than the Inspector required, and yet the verdict was highly unfavourable to the teacher's reputation, because the lines upon which she proceeded did not happen to coincide with those upon which the examiner based his test. These are only every-day occurrences, and those who are acquainted with the working of infant schools might produce many similar instances to show how entirely the education of *non-standard* children is conducted under the influence of, and with a view to, the test; and facts are put into children to be taken out of them again in exactly the same way. No doubt the teacher, if she is an educationist, will try to modify the evil. She will refuse to identify early education with a number of subjects to be separately crammed; and, through her personal influence, the tendency to specialism, so opposed to our best traditions of infant training, will perhaps stop short of its worst effects. But the very presence of a corrective seems to point to an evil engendered by the system.

The practical sense of an Englishman prompts the following question. Supposing the practice of our infant schools were remodelled according to the principles of the new education, should we have the high percentages in reading and writing at the age of seven years? I do not think so. The immediate result of a more thorough introduction of Pestalozzi-Fröbelian principles would be a decided lowering of the percentages according to the present interpretation of the law. Would it, then, be desirable deliberately to renounce our 96 and 99 per cent.? Is the principle of judging by "results" not tantamount to knowing a tree by its fruit, and shall we abandon a basis so sure, so grounded on reason? Assuredly not. What is advocated here is not an *abandonment* of our educational maxim, but rather a *deepening* of its meaning. We adhere to the principle of judging by results because it is a law of nature, the law of the cause being proportionate to its effect; but let us widen the scope of its meaning so as to include effects moral and intellectual. We may consider the beginnings of instruction from two radically different points of view. The acquisitions of reading, writing, and ciphering may be viewed as knacks, as mechanical arts, which must be mastered before the pupil can taste the pleasures of knowledge. There is nothing *organic* in such instruction; the beautiful symbol of the relation which the inner forces of the tree bear to its fruit is a jingle of words to such as take this view. The elementary acquisitions are a fruit that has not *grown;* they bear no relation to the process of mental development.

On the other hand, if these acquisitions are viewed in their relations to the growth of mind, if they are not forced upon the child until their *utility* is self-evident, if the order of acquirement be that which is imposed by the constitution of the child's mind, we consider them in the light of a problem of the highest psychological importance.

It has been justly a boast with the Germans that they, more than any other European nation, recognised Pestalozzi's efforts in the direction of a psychological basis for the beginning of instruction, and in considering education as a branch of statesmanship. The political and social circumstances of the time were peculiarly favourable to the reception of a new, creative principle in education. Geographically and politically Germany was a name; she had sunk to the depths of national degradation. But as with individuals, so with nations—the moments of a crushing misfortune are often those most favourable to the birth of new spiritual truths. In his memorable "Addresses," Fichte's voice was heard like a trumpet call throughout the land; he pointed to Pestalozzi as the saviour of the nations. From that hour the whole German scholastic world has become literally saturated with the principles of Pestalozzianism. So unreserved, so wholesale has been the adoption of the new educational life, that, from its extent alone, it must be reckoned with as a national feature by all those who would study the intellectual life of Germany. Since then another wave of educational thought has been slowly passing over Germany, proceeding from the original impetus given by Pestalozzi, yet with features sufficiently distinct to entitle it to a separate name. It has now reached our shores, and has been crystallized in the form of the "Kindergarten." The principle must, however, admit of a variety of adaptations; and it must, sooner or later, exert a greater influence than hitherto upon the co-existing institution of the infant school.

Our national system is not only covering all England with elementary schools, but it is also multiplying centres for the discussion and elucidation of questions relating to education. For the functions of school boards will be but half performed in the future if they limit their action to voting supplies and to setting a blind machinery in motion. As the mechanism may be expected to work with increasing smoothness, and with decreasing need for attention to the first elements of management, the higher work of school boards will consist in bringing a certain amount of educated thought to bear directly upon the problems of educational science.

Would it not be possible, even now, to allow more scope for the application of Pestalozzi-Fröbelian principles within the operations of the Elementary Education Acts? Why should not school boards here and there set apart a few infant schools to begin with, for a certain term of years, for the especial purpose of applying the principles of the Kindergarten still more thoroughly to our national system? Why should not such experiments receive the sanction of Government and be judged under special instructions to Inspectors to consider them in the light of the educational principles they involve rather than by the trick of "passes," already beginning to be found fallacious in gauging the ultimate worth of educational institutions?

That the test applied, and the mode of appraising directly in £ s. d. the educational value of work done, is unsatisfactory, may be gleaned here and there from H.M. Inspectors' reports to the Department. In 1877 Mr. Scoltock, H.M. Inspector for the Birmingham district, spoke of the educational work in elementary schools generally in the following strain:—

> . . . . "It will be seen that the inspector and his assistants agree in thinking that the teaching has become mechanical rather than intelligent; that the school is valued rather by the number of 'passes' and largeness of the grant; that attempts are being made to reduce teaching to a dry matter of statistics, and to drive children in a hackneyed road, instead of developing their intelligence and gently guiding their faculties. Moreover, to teachers themselves this comparison of averages is most unfair. An idle and slippery master in a well-to-do neighbourhood, if aided by clever assistants, may show glorious results without doing an hour's real work; whereas in a neighbourhood thronged by the careless and the vicious, another may work the very life out, and his results will show but a wretched percentage."

It must be observed that the above strictures upon our system do not, in Mr. Scoltock's opinion, apply to infant schools, seeing that very great satisfaction is expressed with regard to them in the very same report.* But the question naturally arises, how is it possible that the infant school should escape the general educational blight here depicted, or rise above the all but universal dead level? Indeed so far is it from being exempt, that the causes of hindrance to education in any real sense operate most severely upon the education of the younger children, and during the period of life when the capabilities of the human being (in contradistinction to the professional aptitudes of later years) are developing themselves.

It is evident that no new principle can be suddenly applied on any large scale to existing circumstances; for the persons likely to understand such a principle are always few; and if the teachers employed are themselves only learning, failures are sure to occur, concerning which it will be very difficult to determine how much is due to defects of the principle itself, and how much to the imperfections of its application. For this reason there would be a disadvantage in choosing large infant schools, such as most of those under the London School Board, for the thorough application of Pestalozzi-Fröbelian principles. And, indeed, in any elementary school there is a difficulty to be faced in the number of children usually assigned to each teacher.

---

* See page 49.

Under the London Board a staff is supplied at the rate of an average of 30 children to a pupil teacher, and 60 to an assistant; but practically a pupil teacher is expected to teach 40, and an assistant 70 infants. To people interested in the education question it must appear especially undesirable that children under six years should be educated in such masses; and although a State system can at the best offer but a poor substitute for the divinely appointed means for the young child's education, the family, surely it would be well for the controllers of our national educational system to consider whether there is not some limit to legitimate divergence from the natural conditions of child-life. A teacher with from 60 to 70 children must, in self-defence, allow the least possible scope for individuality to assert itself; the *personal* links between children and teacher are weakened; the whole character of her intercourse with her children changes; uniformity, drill, a superficial order (the elements of which are almost entirely physical) must be maintained. How typical of this condition of things is the dull cadence of "Yes—tea—cher, No—tea—cher," into which the mass breaks forth, *as with one voice*, at stated intervals during what is called an oral lesson.

That there are numerical limits, beyond which a teacher's moral and intellectual power ceases to act with undiminished intensity, is certainly acknowledged by some of H.M. Inspectors in their reports to the Education Department; and I think even infant schools are admitted to educational consideration in this respect. For instance, the Rev. D. J. Stewart, Inspector for the Metropolitan division of

Greenwich, is a warm and constant advocate of smaller groups of children on educational grounds. He says, in 1877 (the italics being my own):—

> "... . *the staff is in many cases so small, that each member of it is made responsible for what would be called a school in a country parish.* It is always harder to carry on a school of infants well than one attended by older children, on account of the constant strain on the teacher, and the demand for a peculiar technical (?) skill; *but when each class would be more correctly called a division, by reason of its size, a teacher is obviously overtaxed. In one school I saw an assistant attempt to give a reading lesson to sixty children at once. I cannot persuade myself that such a lesson could have much practical value; and I fear that when the children are removed to the other departments on account of age, the process of teaching them will have to be begun again, just as if they never had been at school.*" *

In 1878 he speaks again of the defects in instruction due to the system of organisation in "divisions:"—

> .... "A great deal of what is called reading might be called repeating from memory. . . . To train a child to read a book on a particular day is not a difficult task; but to give it a general power of recognising at once the ordinary words of our language under any circumstances is quite another matter. It is very easy to see that children 'pass' under favourable conditions without being really taught to read. I do not see else how to explain the fact that many children who have been through schools in the receipt of annual grants are either unable to read at all, or can merely blunder through a sentence two or three years after leaving school. The statistics of the attainments of the boys who are admitted to the Royal Arsenal bear very closely on this point. . . ."

In the school of the Royal Arsenal at Woolwich the maximum number of days at which a boy can attend is 47, and the Rev. D. J. Stewart gives the following table, showing the results of the entrance examination:—

Boys admitted who had no knowledge of the Elementary Subjects of Instruction.

1874 . .	25·2 per cent.
1875 . .	26·5 "
1876 . .	25·8 "

---

* See remarks on the Royal Arsenal School, page 58.

Boys that could be classed only with those who were to be presented in Standards I. and II.

1874 . .	50·3 per cent.
1875 . .	48·0 „
1876 . .	45·1 „

He then goes on to give the following particulars (the italics being my own):—

> "All the boys admitted in April, June, and August, 1877, were over fourteen years of age; but 27·1 per cent. could do nothing, and 48·8 per cent. have, on account of their backwardness, been put into classes which will be presented in Standards I. and II. *All those who have been examined according to these standards this year had been at other schools previously; those in Standard I. for an average period of* 4 *years and* 7 *months, and those in Standard II. for* 3 *years and* 10 *months.* These facts are not encouraging, but they are not unexpected; *I have before this met with children who, although they had passed before me the prescribed examinations creditably enough to bring grants to their schools, had in six or seven months after leaving these schools lost all they were supposed to have learned from them. There are boys in the Arsenal works who have never been at school, and as they pass our examinations just as well as those who have, the Arsenal school may fairly claim all the credit of its pupils' performances; its success is due to the fact that it is organised in small classes under competent teachers.*" . . . .

Sometimes the public is caught by a display of disciplinary power of the military kind in schools. It is indeed a ready means of order, and may be exercised over unlimited numbers. But as applied to infants it seems open to grave objections; and although one may assent in a general way to the assertion that the association of children is a pure gain for their education, it is possible, on the other hand, to exceed the limits beyond which the blessing is turned into an evil of a most regrettable kind. Surely the mere *mass* over which power is exercised is not the real measure of educational ability. Extent of surface is not always the concomitant of functional activity of a higher kind, and it is to be surmised that in order to raise the *quality* of the educational power we must modify our somewhat crude notion of massing infants for educational ends.

This question has the most direct bearing upon the children's moral and intellectual progress, and it is one which at the same time brings us into collision with economical considerations. These deserve serious attention, for here we are brought face to face with one of the chief obstacles in the way of introducing any principle of development, rather than of cram, into our infant schools. Teachers of elementary schools are no doubt well paid, and the staff of any one board school represents in the aggregate a large item of expenditure. If teachers are overtaxed with large classes they have at least large pay, and no one would seriously propose small classes and smaller pay; nor would any one expect that the professional body of teachers would be so good as to make a sacrifice which the public generally was not inclined to make on educational grounds. The question will be settled one day on the higher platform of national educational legislation.

Meanwhile there seems to be one loophole of escape out of the difficulty, and that is the introduction of extraneous help—help not supplied in the usual way from elementary training colleges. Of course the weakness of such an experiment as that of introducing new auxiliaries into the routine of trained labour is evident, and consists in (1) the probable irregularity of such service, (2) the unskilled character of such help. If these arguments against voluntary aid are true generally, they hold good especially in the domain of school-keeping, where a little irregularity is sufficient to throw the whole educational machinery out of order. I am not, therefore, about to advocate the throwing open the floodgates for undisciplined energy to expend itself to the detriment of the children of the poor.

Suppose an infant school to be excepted from the ordinary conditions of examination, though still subject to inspection and receiving aid on satisfactory proof of efficiency according to Kindergarten principles. It is surely not inconceivable that permission for such an experiment might be obtained, nor need the sacred rules of the Code be infringed to any perilous extent The Head would be a person generally acquainted with the principles and practice of education (not merely those of instruction), and she should be especially versed in the principles underlying Kindergarten practices.

She might be assisted by a staff of auxiliary, *but not unpaid* workers. These would rank as and receive the pay of pupil teachers in their second year, and they should, if possible, be numerous enough to admit of an average of not more than 25 children to each class. Thus a small school of 100 children in average attendance would be worked by the head and four pupil teachers (viz. one of the ordinary kind, so as to comply with the requirements of the code, and three auxiliaries), who should be completely under the control of the Head, being nominated for appointment or subject to removal by her; and she, in turn, should be directly and solely responsible to a subcommittee of the school board or other highest school authority. The pay of such extra pupil teachers need not be high. There are many young people to whom the opportunity of instruction and practice in genuine Kindergarten work would be a consideration more valuable than money. The requirements of the Government code as to staff being complied with by the appointment of one apprentice in addition to the head mistress, the remaining pupil teachers might be above the regulation limit of age. Some of them would also probably come from those ranks from which governesses in families and teachers in schools for the higher middle classes are recruited.

The general question of bringing some of the refinement generally found in those who have enjoyed the advantages of home culture has been so eloquently set forth by Mr. Myers, H.M. Inspector for the Metropolitan division of Tower Hamlets, that I cannot do better than reproduce his words, the italics, as usual, being my own. He speaks in 1876 of the desirability of having "poor gentlewomen" to teach in elementary schools—

> . . . . "There are many ladies in want of employment who might easily qualify themselves for such teaching as is needed in a good elementary school. About a score of such teachers is now being trained at Bishop Otter's College; but I believe that if not a few score but a thousand trained for the work were to enter on it in the next few years there would be places for all, and the average salary would scarcely be reduced. For the demand for schoolmistresses is not only active but extensible; the managers of many small mixed schools

would be glad to engage a good mistress instead of an indifferent master whom the salary will procure. . . . . Miss Hubbard and others are doing good service to elementary schools by making it widely known that by the exercise of an amount of intelligence and energy, which are certainly not too much to expect of any one who wishes to make her life useful to others, a poor gentlewoman may attain in two or three years to a position where she will receive a salary of £90 or £100 per annum, will be perfectly independent for two days in each week and for a great part of the remaining five days, and will be able to make every good quality of head and heart which she possesses effective for the permanent welfare of a hundred young lives committed to her charge. There is nothing undignified in her position; she needs to humour no one so long as she does her duty; and her influence over the children is all the greater, because she is likely to be the best bred and best informed person whom they have ever familiarly known. A young girl's respectful affections for her schoolmistress is often for a time the best element in her life, and when kept up in after years may often be an invaluable safeguard and help. When I had charge of the Hackney district I repeatedly visited a school board school where almost all the girls were the children of professional thieves. The mistress was a lady who resigned a good position as private governess out of desire for this missionary work. The result of her work, as seen in the contrast in expression, speech, and aspect between the new arrivals and those who had enjoyed a year's schooling, was almost startling. I certainly felt that this lady had made herself a career which was entirely satisfactory, where every power that she possessed was finding its exercise in a direction undoubtedly and without drawback beneficent. In a career where the satisfaction derived from the work itself may be so sound and so pervading the amusements of leisure become less important. But I may remark that as regards *society*, the lady who adopts this calling has two courses open to her. There are many among the homes of the county clergy, where the schoolmistress, established next door to the church and rectory, will be welcomed as a coadjutor and friend. And it is still easier for her to find a post under the London School Board, or in some large town where no one will concern himself about the precise shade of her educational employment, and where she may make or keep friends at least as easily as a daily governess can do so. I have spoken only so far of *paid* positions, and I do not think that a benevolent person should shun a good work because it is paid any more than because it is unpaid. But there is plenty of unpaid work to be done, and I believe there are plenty of unpaid people to do it. The number of ladies who have of late years taken up nursing as a profession shows how much disposable benevolence exists, ready to do any work which can be shown to be useful. I would suggest that the training and guidance of pupil teachers and of young women in training colleges offers a field which is yet but scantily filled. . . . . *For in the present necessary transition from a system of patronage to a system of* *independence we need great care, lest we lose much which cannot be replaced.* We desire no longer, if we ever desired, to teach the poor to sum up their scheme of life in Dickens's typical quatrain :—

> 'O let us love our occupations,
> Bless the squire and his relations,
> Live upon our daily rations,
> And always know our proper stations.'

But, nevertheless, whilst profound differences continue to exist between class and class it is useless to ignore them. The right thing is to do all we can to lessen them by confronting, in whatever ways a changing age demands, the lower with the higher ideal, *by bringing to bear upon the rudest of our people the gentleness of a lifelong culture and the hereditary instinct of honour. This is the soul of what is called the voluntary system; and though there should be a school board in every parish in England, this spirit need not die; the duty of the upper classes to the lower will remain the same; it is not a duty which can be fulfilled by paying others to do it.* To sum up, the great need of elementary schools is an improvement in their teachers. This may be effected in some measure from without, by a stricter and more careful management of our monitorial and training system, but in much larger measure from within, by a wide recognition on the part of sensible and kind-hearted persons in all ranks *that here is a good work which wants doing as much as ever, and that perhaps they ought to help to do it.* And my lords may be very sure that unless the whole body of teachers be in some way raised to the level at which the *best* now stand, England will have been covered with schools in vain."

There is no doubt also that to understand the deep philosophical ground upon which the Kindergarten practice is based a certain mental discipline is necessary. In the practice culture is equally imperative *because it is simple*, and simplicity can only come with general culture. Our methods in infant schools are too artificial, and, as H.M. Inspector would call it, a *technical* skill is required nowadays of an infant mistress. Why so prominently technical? Surely women and children are naturally associated together, and by developing womanly capabilities we should at the same time go far towards preparing them for application to the work of a mistress in an infant school. At any rate let us beware lest the technical preparation should efface the broad lines drawn by the unerring hand of nature.

It has been my object in this chapter to point out some of the chief difficulties in the way of applying Kindergarten principles and practice to infant schools under the Education Department, and how these might possibly be met without incurring great cost. This might, I think, be done by securing a Head who is conversant with the principles of the new education, and by apprenticing under her young women bringing a good education and refinement with them. They would be paid no more than sufficient to make them responsible assistants while learning the theory and the practice of their profession.

The changes in organisation would bring about certain modifications in the building, furniture, and playground of such a school, but these are details that do not properly belong to the exposition of principles and the outline of practice here given. This was designed to show that by a more thorough introduction of these principles and practice the *temporary* sacrifice on the side of proficiency in particular subjects would be more than covered by the gain in moral and intellectual power resulting from the greater unity of design in the work of an infant school.

PART II.

A FEW OCCUPATIONS EXPLAINED AND APPLIED.

ALTHOUGH it will be seen from the foregoing remarks that the Fröbelian gifts and occupations are not considered *co-extensive* with Fröbel's system, and that the principle might be recognised equally in the modifications of existing educational practice and arrangements, resulting perhaps in a new *type* of infant school, on the other hand the reader will be far from concluding that the series of gifts and occupations have not a legitimate use and place in any plan of early education framed upon progressive principles. As has already been remarked, so much has been written on the occupations, that to give a detailed description of them would be to repeat what has already been well said. Only a few of the less well-known occupations, therefore, have been chosen, and these have been handled with a view to furnishing teachers with some practical illustrations of the way in which these occupations are helpful in developing ideas of form, colour, and number in children. The advantage of a *graduated series* of exercises in an occupation is obvious; and these should always be kept up alongside of the representation of the natural object.

PAPER-FOLDING.

THE paper we work with may be cut to any regular shape; those most generally used are the four-inch square, the oblong, the equilateral triangle (equal-sided triangle), and the hexagon. We shall confine ourselves to the square, which is the simplest rectilineal figure, and we start with the following definition :—

The square is a plane figure having four equal sides and four equal angles.

What kind of angles do we know

them to be therefore? Could you draw a four-sided figure with equal sides and one right angle, the other three angles being of any other kind?

We group the exercises conveniently in the following way:—

Group A, Familiar Objects. (In the series we recognise three stages, the differences to be afterwards explained.)

Group B, Symmetrical Forms.

Group C, Geometrical and Numerical Exercises (three stages).

The chief rules in Paper-folding, as in other occupations, are—

1. Make the following exercise out of the last *with the least possible change.*

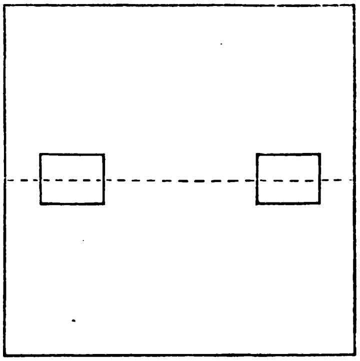
2. Look for the *reverse* to the last form, either in the size or position of its parts. Sometimes we apply No. 1, sometimes No. 2, sometimes we notice how both these rules may be applied to one and the same paper-folding exercise. Let us learn those exercises included under

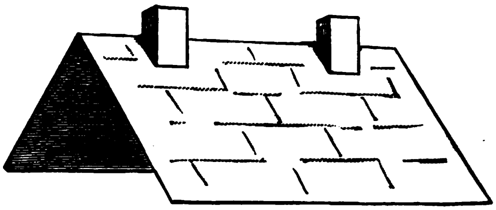
GROUP A.—FAMILIAR OBJECTS.

When possible, the folding of objects should have some reference to the object instruction, as, for example, when in the Kindergarten or Transition class "water" is the object under consideration, the children learn to fold "boats" in the paper-folding lesson; these they are allowed to float in a basin of water.

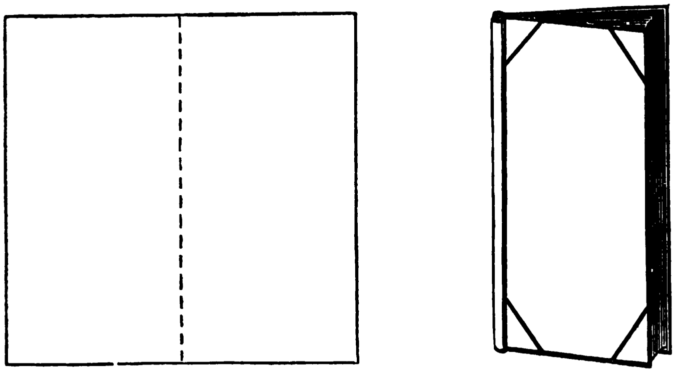
When there happens to be no object under consideration, or when it is impossible to connect the paper-folding lesson with the object instruction, then a regular order or series of paper-folding exercises is resorted to. We shall now learn such a series in three stages. Each object should be made from a fresh square, but it will be observed that rule No. 1 holds good, and that for each additional fold the name of some familiar thing to which it bears more or less resemblance is given. These names are an aid to the memory in remembering each fold in succession.

1st Stage of Objects.—Starting point from the unfolded square to the first ground form.

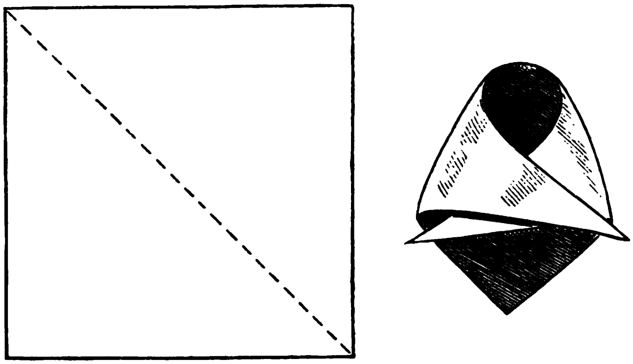




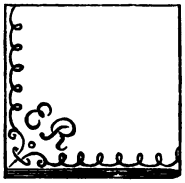
1. *The Roof.*—Fold the upper edge on to the lower edge of the square.



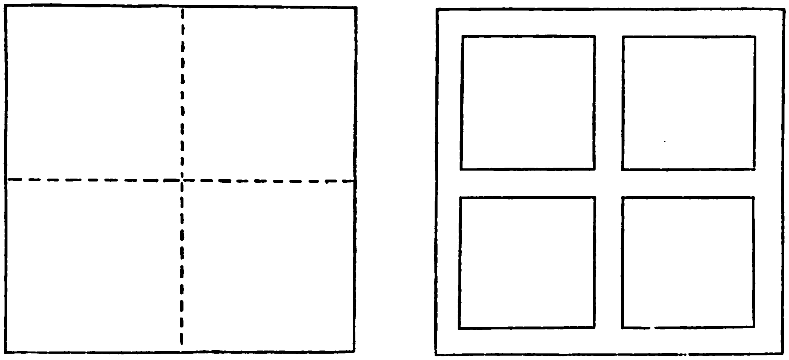
2. *The Book.*—Fold the left edge on to the right edge of the square.



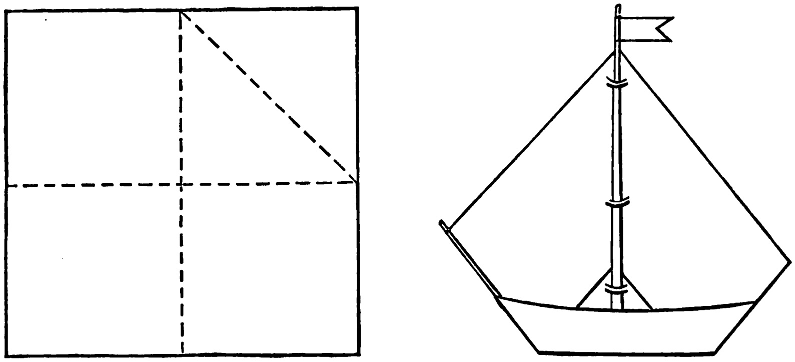
3. *The Shawl.*—The lower edge is folded on to the right side.



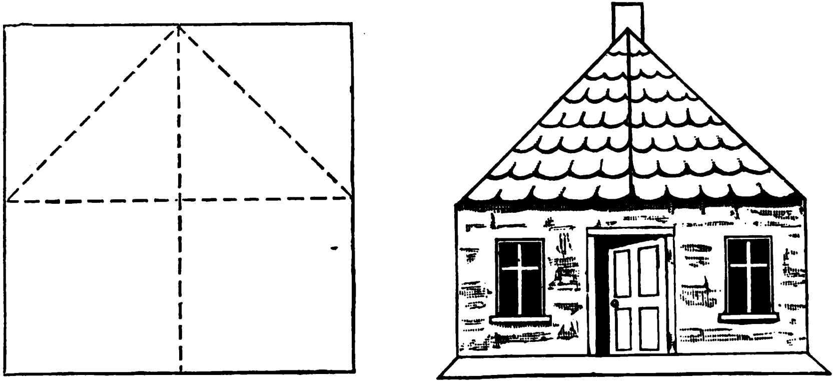
4. *The Handkerchief.*—Fold as in Nos. 1 and 2.



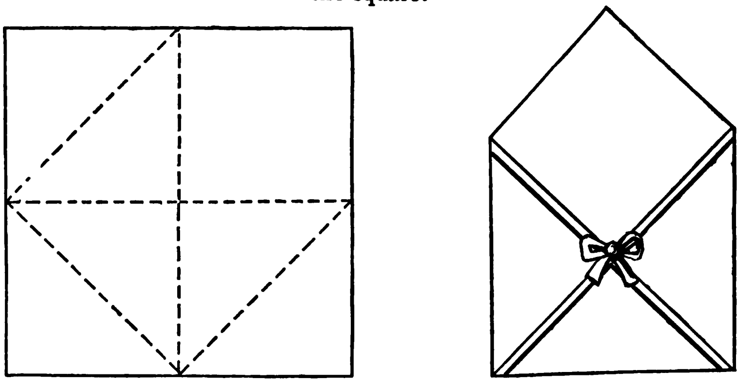
5. *The Window.*—The above is opened out.



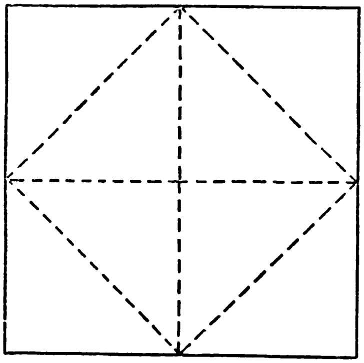
6. *The Ship in Full Sail.*—One corner is folded inwards to the centre of the square.

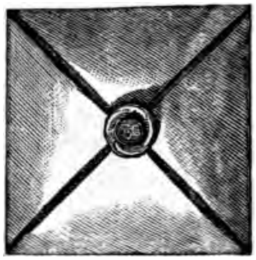


7. *The House.*—Fold a second corner on the same side to the centre of the square.



8. *The Bag.*—Fold a third corner to the centre of the square.





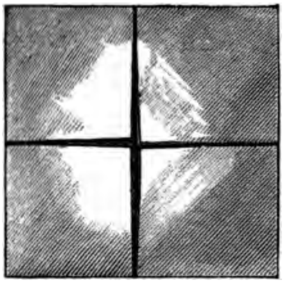
9. *The Letter.*—Fold a fourth corner to the centre of the square.

10. *The Smaller Ship in Full Sail.*—The reverse surface of No. 9 is turned uppermost, and one corner of the square is again folded to the centre.

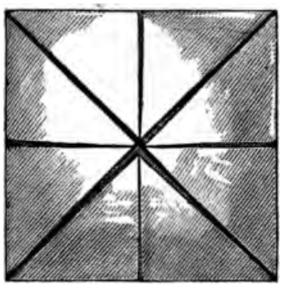
11. *The Smaller House.*—A second corner is folded to the centre.

12. *The Smaller Bag.*—A third corner is folded to the centre.

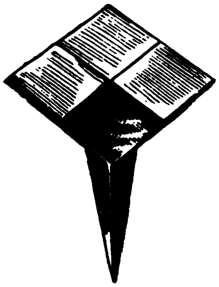
13. *The Smaller Letter.*—The fourth corner is folded to the centre. Thus we arrive at the form otherwise called the first ground form.



2nd Stage of Objects.—Starting point, the first ground form. It will be noticed that the first ground form has four small squares on its upper surface, and four triangles on its lower surface.

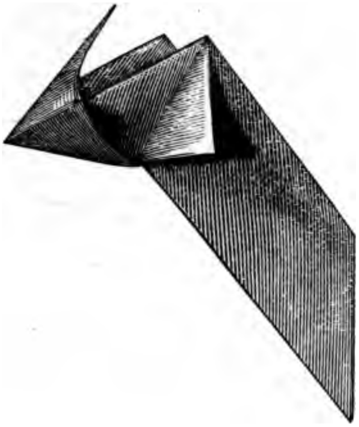


We start by removing a small square from the upper surface, and thus we have an object we shall call—



1. *The Kite* (the toy).

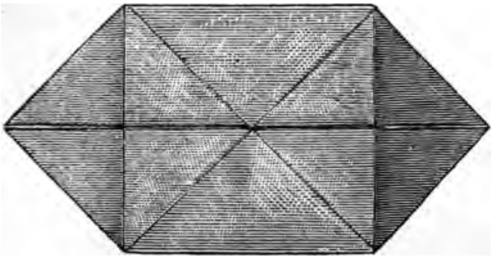
2. *The Bat* (animal).—Remove a second of the small squares opposite to the last.



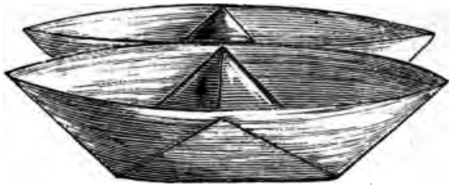
3. *The Bird.*—Remove a third small square to the under surface of the ground form.

4. *The Tablecloth.*—Remove a fourth small square as before.

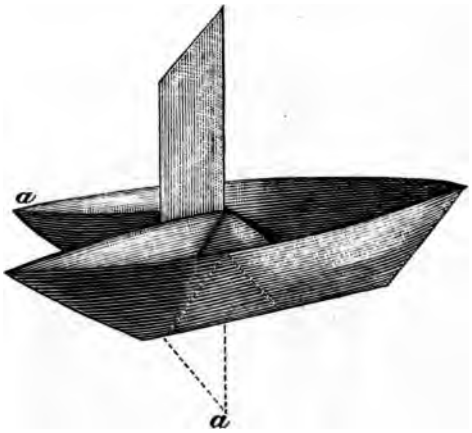
5. *The Windmill.*—The four points or corners of the tablecloth are flattened and arranged to look like the revolving sails of the windmill.



6. *The Cigar Case, or Spectacle Case.*—The four points or corners are folded so that two and two meet together.



7. *The Double Boat.*—Fold the cigar case, or spectacle case, lengthways, into two halves.



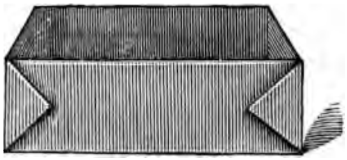
8. *The Boat with a Sail.*—Having four points or corners in No. 7, two in either hand, fold one of them over into the left hand; thus we have three points or corners in the left hand, and one in the right hand. Lay hold of the middle point, or corner, in the left hand and draw it up into a perpendicular position, and at right angles to the remaining points which lie horizontally in the hand.

9. *The Flower Vase.*—Fold one of the two points that lie together down-

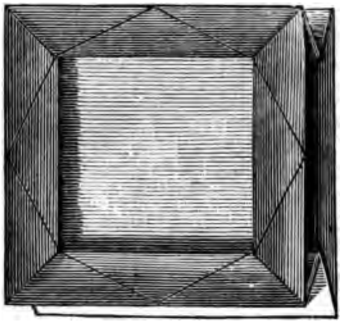
wards. (The point to be folded is marked *a* on boat with sail).

10. *The Boat with a Box for Fish.*—Start from the double boat, fold two points inwards on one boat.

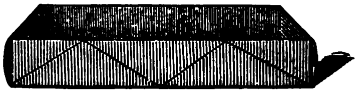
11. *Purse.*—Fold four points inwards in a secure manner.



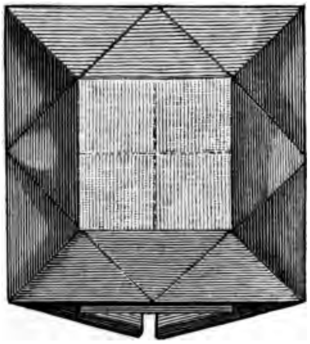
12. *Large Box.*—Take the purse and draw it out.



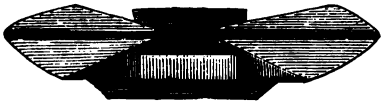
13. *Picture Frame.*—Flatten the large box.



14. *A Firm Box.*—Insert the thumbs within the picture frame, lay hold on either side of the corner and draw it outwards. Do this with each corner.



15. *The Looking Glass.*—Start from No. 13, the picture frame; the edges at the back are folded backwards, half way, they meet at the middle of the back.



16. *The Boat.*—Take the looking glass and fold it across and backwards into two halves. Hold the thick part of the paper between the finger and thumb of the left hand, draw the ends outwards with the right hand.

Start once again from the first ground form,* and divide each of the small squares by a diagonal fold. Press the centre upwards, to a point, and we have—

17. *The Work Basket with four pockets.*

18. *The Travelling Bag.*—Flatten the foregoing, so as to leave two pockets.

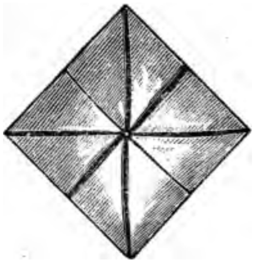
19. *The Flower.*—Instead of raising the centre, as in No. 17, depress the same.

---

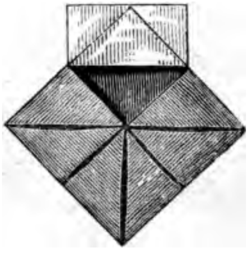
* See beginning of 2nd Stage of Objects.

20. *Another Flower.*—Find a slight variation of No. 19.

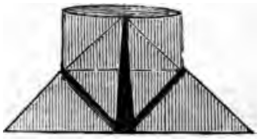
21. *The Chemisette.* — Flatten the above.



3rd Stage of Objects.—Starting point, the double ground form. The double ground form is obtained by folding the four corners of the first ground form to the centre, the surface with the small squares being innermost. In the double ground form we have a form like the first, only a size smaller. On the upper surface we see four small squares, on the under surface we have four triangles. Each of the small squares on the upper surface has a small slit; insert the point of a pencil or penknife into one of these, and draw the square out into the shape of an oblong. Thus we get—



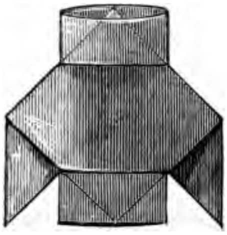
1. *Scent Bottle.*



2. *Pair of Boots.*—Draw out two opposite squares to oblongs, fold the paper horizontally into halves.

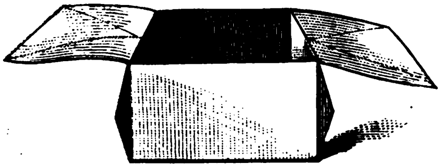
3. *Cross* (draw out four squares to form oblongs).

4. *Hat* (fold the cross into halves).

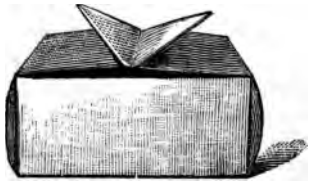


5. *Jacket.*

6. *Knickerbockers* (fold the above horizontally).



7. *Box.*

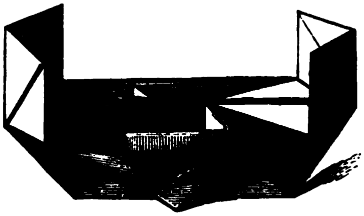


8. *A Box with lid.*

9. *Sandglass.*

10. *Picture Frame.*

11. *Looking Glass.*



12. *Boat.*
The end of 3rd Stage of Objects.

GROUP B.—SYMMETRICAL EXERCISES FROM THE FIRST GROUND FORM.

These interest older children, and should be given occasionally, alternating with the folding of an object.

1st Step.—We begin upon the surface with the four small squares. Fold the corner of each square backwards, so as to divide each square by a diagonal fold. Now find exercise 2, by placing the loose triangular piece in the *opposite* position, namely, on the under surface.

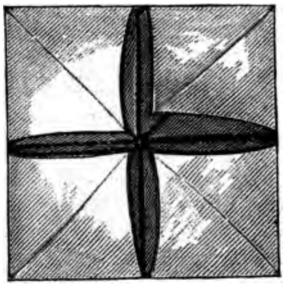
We start from exercise 1 again, and *divide the loose triangular piece into two parts* in various ways, then divide it into *three*, always applying the rules specified at the beginning (see page 65). The alteration should be made on all the four squares at once.

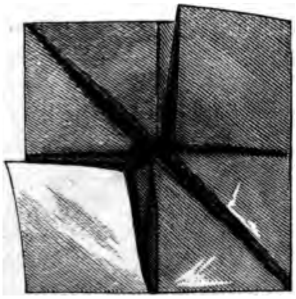
2nd Step.—The chief feature in all the symmetrical forms hitherto invented has been the right angle; we now proceed to make others with the obtuse angle. Find such a series according to known rules.

3rd Step.—The under surface of the first ground form may now be utilised in making symmetrical forms.

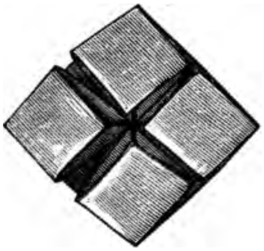
4th Step.—Find a few *intermediate* forms, *i.e.* some which combine the characteristics of steps 1 and 2 in various ways. The intermediate forms should be kept distinct, as their number is inexhaustible, and we may add to them at our leisure. The main forms in a series are comparatively few in number; they are simply those which illustrate the rule of contrast very strikingly.

5th Step.—The upper and under surfaces of the first ground form having been utilised, we endeavour to find new starting points, or ground forms.

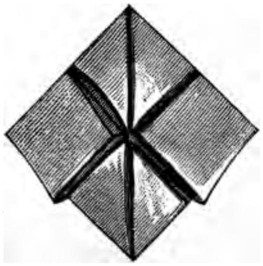




Observe that in the first ground form the squares and triangles are on different surfaces; endeavour to find a new ground form in which the squares shall be on the same side as the triangles. In how far may the ground form be said to be the opposite to the last? We call it the Windmill Ground Form. Now find an intermediate between the first and the Windmill Ground Form. Make the double ground form (see page 71), and find another ground form which shall be a contrast to it; the latter, when found, is called the Double Windmill Ground Form.



Between these intermediates may be found such as this—



6th Step.—We have, until now, supposed the square to have been the only shape used; similar exercises may be based upon other shapes, such as the triangle, the hexagon.

The student may now work out a few of such exercises for herself if she wishes to do so.

GROUP C.—GEOMETRICAL AND NUMERICAL EXERCISES. 1ST AND 2ND STAGES. (See the diagrams of folds under objects, 1st stage, pages 66, 67, 68.)

NOTE.—Those exercises marked with an asterisk *are omitted in the 1st stage, and some may possibly suit the 3rd stage.*

Ex. 1. *Unfolded Square.* — *Sides:* position, name, number, *length, *direction; *corners:* number, *position, *name, *size, *middle point.

**Ex.* 2. *Revolving Square.* — To name any side *formerly* in a certain position; calculation of distance round the centre.

Ex. 3. *Oblong.* — *Sides:* number, length, *direction; *corners:* *position, *name, number, *size, *halves.

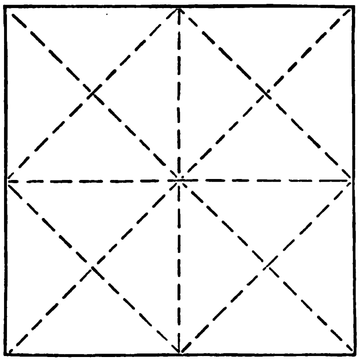
Ex. 4. *Triangle.* — *Sides*, number, *position, *name, *direction; *corners:* number, *position, *size, *name, *halves.

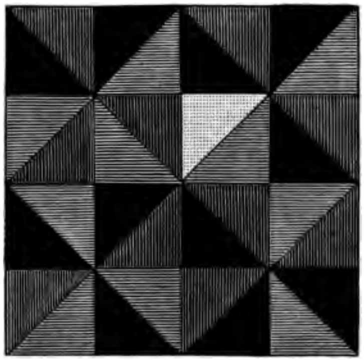
Ex. 5. *Small Square.* — Comparison with large square: What is like? What is unlike? *quarters, another way.

**Ex.* 6 *to* *8.—Five-sided figures to be compared with one another.

**Ex.* 9. *Square.*—Comparison with former square. Eighths.

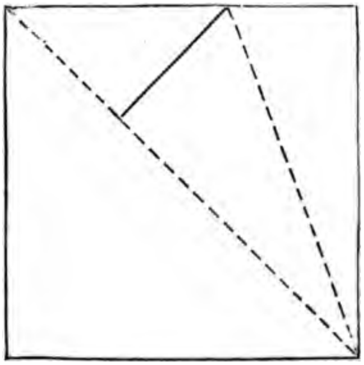
**Ex.* 10 *to* 12.—Comparison with former five-sided figures.



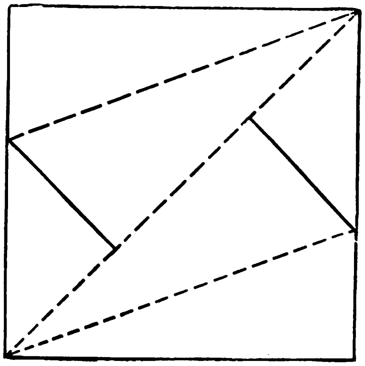


**Ex.* 13.—Comparison with former square. Sixteenths, thirty seconds.

3RD STAGE—6½ YEARS AND UPWARDS.



Ex. 1.—The diagonal of the square. The trapezium.



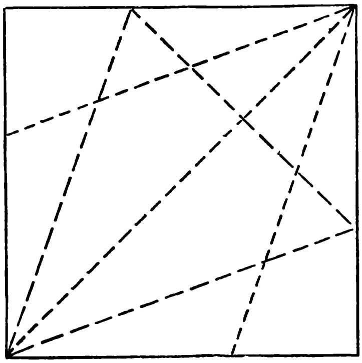
Ex. 2.—The right, obtuse and acute angles. The rhomboid.

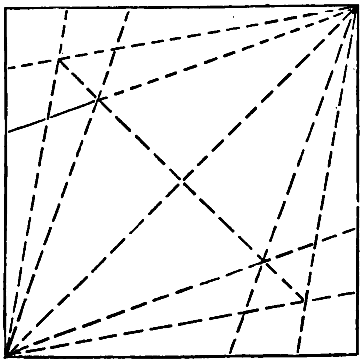
Ex. 3 *and* 4.—Ditto.

Ex. 5.—The rhombus.

Ex. 6.—The obtuse-angled triangle.

Ex. 7.—The acute-angled triangle.





Remarks on Teaching this Occupation.

Although we grouped "Objects" by themselves, "Symmetrical Forms" by themselves, and "Geometrical Exercises" by themselves for our own convenience whilst *learning*, it is not advisable to keep these strictly separate in *teaching*. On the contrary, the admixture of both kinds of exercises in every lesson keeps the interest alive. A lesson in "paper-folding" would, therefore, naturally fall into two parts. At the beginning, some ideas of form or number mentioned in Group C would be imparted, after which the paper would assume the more attractive form of "the roof," or "the book," &c. It is a mistake to attempt to teach more than *one* idea at a time from Group C, neither should children learn to fold more than one or two new "objects" in a lesson. What is really required is a little variety in the illustration of *one and the same* idea. Little additions, also, such as are indicated on pages 65, 66, 67, 68, should be at hand, so that the teacher may heighten the children's pleasure by completing the form, and showing them how to do the same. The best folded paper in a class may be selected for completion, and the teacher should have a model of her own to show. These additions are of so simple a nature that they can be made by any child, and they can, with a little preparation, be made in front of the class.

At the end of the 1st stage, we shall suppose children to know and execute the following:—In the geometrical group, they distinguish the corners from the sides of a square, know their number and position, they know *by experience* that the sides are as long as one another, and they do *not* learn the *name* "square" or "oblong" until they know a good many of the properties of these several figures. In making "objects," they have learnt to fold *accurately*, the "roof," &c., up to the "smaller letter" (1st ground form), and they have some intelligent understanding of these objects. A few examples of lessons will now be given in each of the three stages.

EXAMPLES OF LESSONS IN PAPER-FOLDING.

1ST STAGE.

Material.—Every child is provided with a square piece of coloured paper (brick colour); the teacher has a square rather larger, which she lays upon a sloping surface in front of her.

Teacher. Lay your paper before you on the "pretty" side. Can you see the colour when this is done? Do you remember my story about "Johnnie, who hurt himself"?

Children. Yes; he was running, and he knocked himself! He knocked himself against the table!

Teacher. What part of the table hurts little children so very much when they knock themselves?

A child. A corner hurts.

Teacher. Yes, it was a corner that hurt "Johnnie" so much. Can you find a corner on my table? Can you find another? Now look at my pretty paper and see if it has any corners. Now look and see if your pretty papers have a corner there like mine. Point to another on my paper. Now point to another corner on your paper. Has my paper any other corner? And yet another? How many corners has it altogether? How many corners has your pretty paper altogether?

Teacher. Let us say together: "We have found four corners on our paper." (Simultaneous repetition.)

Teacher. Take up your pretty paper in the left hand, thus: Touch a corner gently with the "pointing" finger of the right hand. Does the corner do anything to your finger?

A child. It pricks!

Teacher. Well, so does mine; the paper corner does not hurt as much as the table corner, but it gives us, as Mary says, a *prick.*

Teacher. Now lay your papers on the pretty side once more, on the table, thus: Take the two corners *nearest* to you, one in each hand, thus: Lay those two corners on the top of the other two corners and hold them there; then make a fold in the paper, thus.

Teacher. How many corners can you see of the four? Where have the others gone to? Do you think they are hiding?

Children. Yes; they are behind.

Teacher. Do you remember when we were playing in the ring, how Willie hid behind me? Could you see him?

Child. Yes; once he peeped out.

Teacher. Well, I think our corners have gone to hide behind one another. How many corners are hiding? Remember I do not wish to see a corner peeping out from behind. I shall come and see whether they are well hidden.

(The teacher ascertains whether the papers have been pretty well folded.)

Teacher (taking her paper and half-opening it so as to represent a roof, she places it upon a cube of bricks.)

Children. A house! a house!

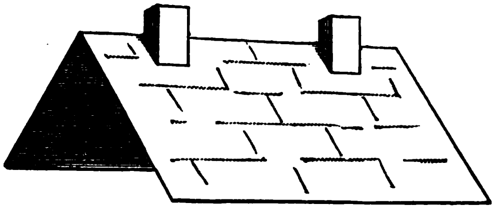
Teacher. What part of the house have you just made?

Let me see if any of your papers would make good roofs. (She selects the best folded paper.) This is well made, I think it would do nicely for the house I have built with bricks; my paper makes too large a roof; or do you think the house we build will do without a roof?

Children. No! no!

Teacher. Should we be warm and comfortable in our schoolroom if our school had no roof? &c., &c. What things would come into our schoolroom to make us uncomfortable?

Teacher. You have told me much about the things that *come into* the house when the roof is not there, or when there is only a hole in the roof; can you think of something that goes *out* through a hole in the roof?



(The teacher has previously cut and gummed the chimneys; she, therefore, has only to cut two square holes in the roof and to insert them whilst the children are looking on.)

Teacher. Another day, when we have our papers, I shall give a "chimney" to every child who has folded his "roof" carefully.

NOTE.—It would perhaps be necessary to repeat both the first and the last exercises in the above lesson more than once; but each time a different point may be dwelt upon, *e.g.* in making the object the "covering" for the roof might be discussed, and with pencils the tiles might be drawn; another day the slope of the roof might be commented upon, and a drop or two of water from a wet sponge would be made to run down on the glazed surface of the paper. Then, with the geometrical ideas to be conveyed, the difference between the "*edge*" and "*corner*" may be conveyed simply by asking a child to point to one and to the other; he notices how, in showing the edge, his finger "moves along," but, in pointing to a corner, the finger "stands still," &c. A short story might be finally told, in which the object they have learnt to fold is woven into the narrative.

LESSON, 2ND STAGE.

Material.—Every child has three white squares of paper and a coloured chalk pencil; the teacher is provided with three squares of paper on a larger scale than those of the children.

1st Part.—Ex. 2, from Geometrical Group, the *revolving square.* This may be found useful for older children as well.

2nd Part.—Ex. 2 from Group of Objects, the kite (plaything). Story.

Teacher. Find the middle of your squares.

Teacher. Lay your squares on the table before you, so as to have an "even-along" line at the top and an "up-and-down" line at the right side of your papers. What do you see at the left side? At the bottom?

How many "even-along" lines do you see on your paper? How many "up-and-down" lines are there?

Who could repeat in a nice sentence all we have said about the lines on our paper.

(The sentence is then repeated simultaneously.)

Teacher. Take up your pencils. Make a little mark, thus, at the top of your paper. Now try to place your paper so that the top shall be at the right side. Rest the point of your pencil upon the middle, and keep it there. I will put a pin in the middle of mine.

Which edge (or side) is now at the top?

Which edge is now at the bottom?

Which edge is now at the left hand? &c.

Turn your paper again, so as to place the top edge at the bottom.

(Questions as above.)

Teacher. What did you do with your paper to bring the top to the right side, and then to the bottom?

Answer. We *moved* the paper.

Teacher (removing the pin, and giving the paper a gentle push). I have moved my paper. Has that movement brought the top edge to the right, and then to the bottom? (No. You must hold the middle.)

Teacher. Come now, tell me when you moved your papers just now, what part did not seem to move?

Answer. (The middle did not move; we held it fast.) When we hold the middle, and the rest of the paper moves, we say we *turn* the paper. (Repeat.)

Teacher. Name something else in which the middle seems to stand still whilst the rest of it moves.

Teacher. Put your pencils (finger) upon the middle of your papers once more. Turn your papers, so as to bring the top edge to the left, &c.

(See questions as before.)

Teacher. Turn the papers so as to bring the top to the same place as at first. Let the top edge set out on the same journey again. Turn it to the right—to the bottom—to the left—to the top. Halt!

How many times did you turn your paper, a little bit, before the top edge came back to its own place?

In which direction (which "way,") did it go?

How much of the *whole way round** did the top edge go each time you turned it?

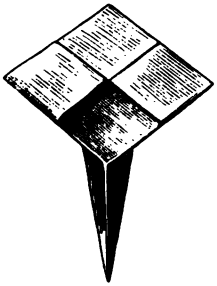
2nd Part.—Object.

Teacher. Fold the 1st ground form.

Teacher. Lay the ground form so as to see four small squares on the upper surface.

What do you see on the under surface?

Raise one of the small squares by putting your finger under it, thus. Bring the small square over to the under surface, and let it form a point, thus.



Teacher. Do you know any name for this? (A kite.)

(Here follows a little conversation, perhaps a story.)

ANOTHER LESSON.

Material.—As before; picture of a bat (animal).

1st Part.—Ex. 1 and 3. Subject, "halves."

2nd Part.—Ex. 2 and 3. Objects, the "bat," and the "bird."

1st Part.—*Teacher.* Take your square and lay it before you, as usual. Are there any marks or folds upon your paper? (No.)

Take the two bottom corners, and lay them upon the two top corners. Now make a fold across the paper. Open the paper. Into how many parts is the paper divided?

What shape are those parts?

---

* This question must, of course, be omitted if the children are not advanced enough to understand such a calculation.

Lay the two parts together. How many parts can you see at a time?

Teacher. I hold my paper thus folded between you and me. How many pieces can you see?

How many can I see?

Which of us sees most paper?

What can you tell me about the *size* of these two parts?

(If the children are not convinced, or if they do not grasp the idea, we may resort to the method of teaching *what a thing is*, by showing *what it is not*. The teacher herself divides another square into two parts, oblongs, making them unlike in size.)

Teacher. Into how many parts have I divided this piece of paper?

I hold it up, so. On which side is there most paper? (On the right, or left, side.)

What shall we say about the size of the part on the left side? (It is smaller.)

What can you tell me about the size of the part on the right side? (It is larger.)

Teacher (taking the former square). Shall we call the piece on the left *smaller* than the piece on the right?

(*A child.* No, it is as big as the other.)

Teacher. Right. Now when we divide a *whole* piece of paper into two pieces "*as big as one another*," we give them a name. Do you know it?

2nd Part.—Objects 2 and 3, or else colour with chalk pencils.

Another Lesson.

Material.—White squares, chalk pencils.

1st Part.—On "halves;" Ex. 4 and 5, Geometrical group (these folds are the same as in the 1st stage of objects, Nos. 2 and 3, page 66).

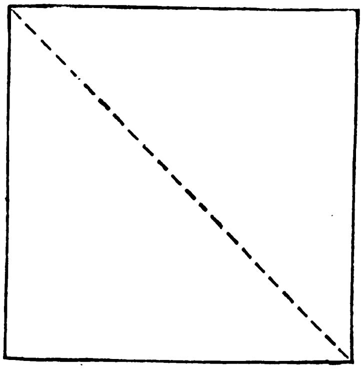
2nd Part.—Either object 4, or exercise with coloured pencils.

Teacher. Let me see if you can remember all we found out about our folding exercise last time. Into how many halves did we fold a *whole* piece of paper?

What was the shape of those "halves"?

How did we know they were "halves"?

Teacher. I should like you to try to fold "halves" once again; but this time they must appear different, the "halves" must not be oblongs.



(Questions, as before, upon the amount of paper seen on either side.)

Teacher. Fold the two parts, or pieces, together.

Has your paper the same shape as before?

How many corners (angles) has it?

How many sides?

What name do we give to that shape? (Triangle = three-angle.)

Try and put your finger *within* one of the corners, thus; try to do this again. Within which angle is there most room?

Which angle looks the largest?

Show me any you see smaller?

*Take a fresh piece of paper, and fold it into two halves that are oblongs.

Lay the oblongs to the left, and the triangles to the right, on the table, thus.

Whether have the oblong halves, or the triangles that are halves, most paper?

A child. The triangles look bigger than the oblongs.

Teacher. Let us measure. Open both papers, lay them on the top of one another unfolded.

Is the *whole* piece that has triangles bigger, or not?

(*Answer.* The *whole* pieces are the same size.)

Teacher. Take the halves that are triangles into the right hand, and the halves that are oblongs into the left hand. Can you say: "I have *more* paper in the right than in the left hand"?

Now fold the two halves together in each paper. Hold them in the right and left hands, as before.

Have the halves in the right hand more paper in them than the halves in the left hand?

How do we know that?

(*Answer.* We measured the two *whole pieces*, and found they were the same size; if so, the half of each paper must be the same size.)

Repeat. When two *whole* pieces of paper are the same size, the *halves* in each paper are the same size.

2nd Part.—Object.

ANOTHER LESSON.

Material.—Every child has two white squares; coloured chalks.

1st Part.—Recapitulation. Ex. 5 of Geometrical group.

2nd Part.—Object 5 "windmill," or colouring "fourths."

Teacher. Lay a square of paper before you so as to have an even-along line at the top. Lay another square on the top of the first, in the same position. Measure them, and see if they are cut the same size.

Say what you think in a complete sentence.

Fold one square into halves, oblongs.

Fold the oblongs into two halves on my paper, Mary. Now do the same thing on your oblongs.

What shape has your paper at present?

How much of the oblong do you see?

How much of the *whole* paper was the oblong?

If the oblong was only half of the *whole* piece, then how much do you see of the half?

(*Answer.* The half of the half piece.)

Take up your pencils and colour the half of the oblong which you see on the top.

Turn the coloured side to the bottom. Colour the small square at the top now.

* This and the following questions upon the comparative size of the triangles and oblongs in two pieces of paper may be omitted when the children are too young.

Lay down your pencils. Tell me how much of the oblong each little square is?

Now open your papers entirely; let them lie before you as at first. What do you see upon them?

Child. I see two coloured squares.

Teacher. Do you see any besides these two coloured squares?

How many little squares are there altogether in the paper?

Teacher. Yes, these four little pieces are joined together so as to make *one whole* piece of paper.

How many of these small pieces just coloured are within this *whole* piece of paper?

Do you think these small pieces are as big as one another? How can we soon find out? (By measuring them, by laying them one on the top of the other.)

Now, when four small pieces, all the same size, make one large piece, we give the small pieces a name. Do you know it? (Fourths.)

When do we call the little pieces "fourths"?

How many "fourths" make one whole piece?

How many "fourths" are there in one half piece?

How many "fourths" have you coloured?

2nd Part.—Take a fresh square and make four "fourths" within it. Take your pencils and colour *one* "fourth." Every child may then change pencils with his neighbour, and colour another "fourth" with another colour. When this is done, change pencils once more, and so we shall have a fresh colour for each "fourth." How many colours shall we have upon our papers when they are finished? Or the object may be folded.

In another lesson "fourths" might be made in the paper, having another shape.

ANOTHER LESSON.

Material as before.

1st Part.—Recapitulation. Ex. 6. Idea of *centre* or *middle point.* A five-sided figure.

2nd Part.—Objects 6 and 7: Cigar-case, double boat.

Teacher. How many halves are there in one whole piece of paper? In one *whole* orange? &c.

Give me another name for the half of a half?

How many "fourths" are inside one *whole* piece of paper?

How many within one half piece of paper?

Look at my large* square here. I wish some one to make a *point* anywhere inside the square with a pencil. (A child does this.)

Teacher. Is the point nearer the left or the right edge?

Nearer the top or nearer the bottom edge? (Measurements taken.)

Teacher. I shall ask another child to draw a picture of my paper square on the blackboard. Now make a point with chalk inside the square that shall be the *very middle*. (The lines on the blackboard aid the eye.)

---

* The square must not be marked by any folds.

Teacher. Another child shall come and do the same on my square of paper. (This is not found to be so easy. One child suggests that a "cross" folded within the square would help them to find the middle. This is done first on the teacher's square, then the children find and mark the "middle point" on their squares.)

Is the "middle point" nearer the top or the bottom edge?

Nearer the right or the left edge? (Measurements taken.)

Then how do we know the "middle point" from all the other points we made?

(*Answer*. It is equally far away from all the edges.)

Take a fresh square, but do not fold it.

Try with your pencils to find the right place, and make a "middle point."

Now fold your papers to make the "cross."

Have you made the "middle point" in the right place?

Having made the "cross," take up your pencils and correct your mistake; put the "middle point" in the right place.

Lay down your pencils once more. Take the top right corner and fold it over on to the "middle point." The corner must just point to that place exactly. Make a fold in the paper so as to keep the corner in the middle. What shape has your paper?

(*Child*. I do not know.)

How many sides (edges) has it now?

Name them on my paper, beginning at the top and going round to the left.

(*Answer*. Top side, left side, bottom side, and right side—top right side.)

Begin at the bottom and name the sides, going round to the right, &c.

How many slanting sides has it?

How many straight up-and-down *sides?*

How many even-along sides?

Where are they?

Teacher. Your paper has five sides, and therefore we call its shape a *five-sided shape*.

Draw a picture of the paper on the slate; on the blackboard.

Which lines must be drawn as long as one another?

Which lines are the longest?

Which lines must be drawn half as long as the longest?

How long must the slanting line be?

2nd Part.—Objects.

ANOTHER LESSON.

Material as before.

1st Part. — Recapitulation; idea of "eighths."

2nd Part.—Colouring "eighths."

Teacher. What kind of point is difficult to make in a square?

What do we mean by the "middle-point"?

What folds help us greatly in finding the place for the middle-point?

Which corner did we afterwards fold to the middle?

How many sides had our paper then?

Take a fresh square and find the middle.

Fold the top right corner to the middle.

What is the opposite of the *right?*

Take the *top left* corner and fold it to the middle also.

How many sides has your paper?

Unfold your paper and tell me how many little pieces you see within it.

How many "fourths" have you divided?

How many "fourths" are not divided?

Into how many pieces have you divided one "fourth"?

Two "fourths"?

Divide another "fourth" into two pieces.

Open up your papers entirely. How many pieces are there now?

How many "fourths" are divided into two pieces?

Teacher. Can you divide another "fourth" into two pieces? How is it done? Do this and open your papers.

How many little pieces do you see?

What shape are they?

Are they as big as one another?

These pieces (or triangles) are as big as one another if we can hide one behind the other.

Hide one of these eight pieces you see on my paper, Mary. (This is done by folding one corner of the square to the centre as before.)

How many pieces can you see now? (Only seven pieces.)

Hide *two* of these eight pieces. Can you do so?

How many pieces can you see?

How many pieces can you not see?

How many pieces are there altogether in the paper?

Are these *the same size?*

When one *whole* piece of paper is thus divided into eight pieces of the same size, we call them "eighths."

Teacher. Hide three "eighths" in your paper. How many "eighths" can you see?

Hide two "eighths." How many "eighths" can you see? &c.

2nd Part.—Take up your chalk pencils, and colour *one eighth* in your paper. (Note. Different colours may be given to the "eighths.")

ANOTHER LESSON.

Material as before.

1st Part.—Recapitulation of the lesson on "eighths."

2nd Part.—Colouring of "eighths," or the following object in the series.

Teacher. Fold my paper into "eighths."

Fold your paper into "eighths."

How many "eighths" put together make a *whole* piece of paper?

Open out your papers, and fold two halves together.

How many "eighths" can you see in one half?

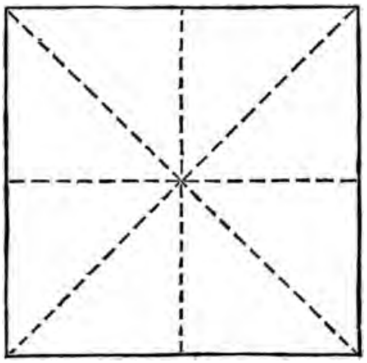
How many "eighths" must be in the half you cannot see?

Fold your papers into "fourths." Tell me how many "eighths" you can see within one fourth? Colour each of those two "eighths" which you see just now; let each be another colour.

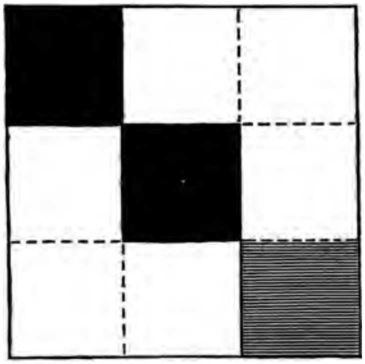
How many "eighths" are in one fourth of your paper?

How many "eighths" will there be in two fourths?

Colour the two "eighths" in another fourth, &c. (Eighths may be folded in another way.)



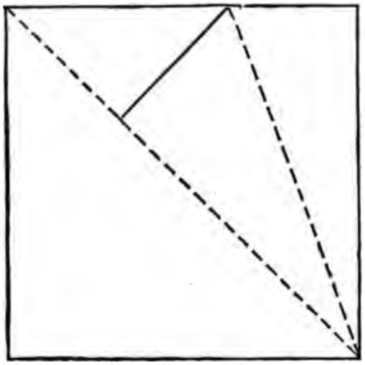
(Ninths may be the subject of another lesson.)



3RD STAGE, 6½ YEARS AND UPWARDS.

Material.—Every child is supplied with several squares of paper for folding, white and coloured; coloured chalk pencils; blackboard and chalk.

Facts to be learnt in connection with the Exercise No. 1.



(I.) The line joining two angles of a square is the *diagonal.*

(II.) The diagonal is longer than the edges of the square of paper.

(III.) The paper is folded so as to form a four-sided figure which has two parallel edges of unequal length.

Teacher. (I.) Lay a square of paper before you, so as to have horizontal and perpendicular edges.

Can you remember which edges we measured formerly?

Answer. We measured the top and bottom edges, the right and left edges.

Teacher. Which edges might we fold together now?

Answer. The bottom edge might be folded on to the left, or on to the right edge.

Teacher. Fold the bottom edge on to the left edge. Open your papers again.

What do you see that was not there before?

Where does that line begin? Where does it end?

Were these angles,* or corners, there before you folded that line?

When such a line touches two angles, or corners, one at either end, we say that line *joins* the two corners (or angles). Here are two points on the blackboard, ▪ ▪, join them by a line, E.

Take up your pencils and trace the line which you have just folded.

The line which joins these two corners (or angles) of your square has a name: it is called a *di - a - gon - al.* Repeat this.

Now take a fresh square of white paper and see if you can join *other* corners (or angles) together. What have you folded?

Answer. A line joining the top edge, with the bottom edge.

Teacher. Now tell me if this line is a di - a - gon - al. Why not?

Answer. It joins two *edges* together, &c.

Teacher. (II.) Take the 1st square to hand. Look at the di - a - gon - al line; now look at the line formed by the bottom edge. Which line seems the longest of the two?

(The children say one thing and another.)

Teacher. You do not know, and some of you are guessing. We can only know by measuring them. Who could show the class how to put the two lines together? (The bottom edge is folded upon the di - a - gon - al.)

Try the same fold upon your own papers.

Now you can tell me which line is the longer of the two?

Try the same upon another square.

Now lay the 1st paper before you. Look at its shape. How many edges has it?

Teacher. Well, that is nothing new, let us see if anything has changed. How many edges *run the same way?* Point to these. Point to those that do not run the same way.

Point again to the edges which run the same way. Are they *as long as one another?* Point to the shorter of the two. Point to the longer of the two.

Now who can tell me what we have learnt regarding the *shape* which we gave to our paper?

Answer. Our paper has four edges. Two edges do not run the same way. Two edges do run the same way. These two edges are not as long as one another.

2nd Part. The simplest symmetrical form from the double ground form may be folded; for practice, *smaller squares* of paper may be distributed to the neatest workers, and the form may be folded on a smaller scale; their work is collected and preserved, and it may be utilised in some joint work, such as that of covering a little box, framing a picture to be hung up in the schoolroom, &c. Children have opportunities for displaying taste in tinting these symmetrical forms with coloured chalks.

---

* The children are supposed to be familiar with the term at this stage.

we have learnt about the new shape we have given our paper?

Answers. Our paper has four sides, or edges.

The two edges opposite one another are equal (*i.e.* are as long as one another, and they run the same way).

The paper has four corners or angles.

Two angles are obtuse.

Two angles are acute.

2nd Part. Symmetrical form from the windmill ground form.

MAT-PLAITING.

THE material necessary is: 1, an oblong piece of paper (mat) slit into strips which remain attached to the margin at either end. 2, loose strips of paper; 3, a stick, or needle as it is called, having a slit at one end into which the loose strip of paper is inserted. With this needle the loose strips are interwoven with the strips of the mat. This occupation reminds one of a primitive loom; in fact we have the principle of *weaving* here, as distinct from *felting;* for the most intricate loom moved by steam would still show us three things necessary for the weaving process, namely: one set of threads proceeding in the direction of the length of the cloth = the warp; another set crossing these in the direction of the width = the weft; and an instrument for carrying the threads of the weft from one side to the other = the shuttle. The paper mat, with the strips stretched lengthways, may be said to represent the warp; the loose strips are used as the threads of the weft; and our plaiting needle is simply a shuttle of a primitive kind. As the threads of the weft must be interlaced with those of the warp at regular intervals, and according to some definite order, to produce a pattern, so is it with the children's occupation of mat-plaiting. There are various degrees of complication in the patterns, and in the introduction of difficulties we must proceed according to a definite order. The *elements* which go to make up more complicated patterns must be understood and practised in order that we and the children may learn to combine them anew.

It is evident that number and form are co-ordinated here, as in other occupations; and that a change in the order of the *numbers* of the strips raised or lowered will produce a corresponding difference in the *patterns.*

We must remember how two elements are essential to the process we call weaving: 1, a constant *change* (contrast) *in the position* of the strips (threads); 2, *regularity* in the change of position. The *regularity* in the pattern is expressed by *numbers,* the change of position, *or contrast of up and down,* when completed, makes *the pattern.* Now the pattern may be completed once, twice, four times in the direction of the width of the mat, and in each case we have one, two, or four times a contrast across the mat. When we complete the pattern *lengthways* in the mat we have contrasted the position of the strips as many times as the pattern is completed, in that direction. Every two rows form a contrast to one another in the pattern 2 up 2 down; consequently, if sixteen rows be woven into the mat, the contrast will occur eight times in the direction of the length of the mat. Children may be taught to count, not only the single numbers, but the numbers of contrasts in a mat, either in the direction of its breadth or its length. The pattern 1 up 3 down plaited into a mat of 20 tight strips would represent how many single numbers in a row? Ten numbers. How many times can the *pattern* be plaited across the mat?

We may now proceed to group the exercises so as to form a graduated series, in which the elements of more elaborate patterns are disentangled and learnt separately.

The following exercises correspond to those given in other occupations under

GROUP C.—MAT-PLAITING EXERCISES.

1st Step. One Sub-Pattern in a Mat.—It is contrasted in the 2nd row, and is composed of equal, afterwards of unequal, numbers, *e.g.* 1st row, 1 u. 1 d., &c.; 2nd row, 1 d. 2 u., &c.

2nd Step. Two Sub-Patterns in a Mat.—Each sub-pattern is immediately contrasted, and is composed either of equal or unequal numbers, *e.g.* 1st row, 1 u. 3 d., &c.; 2nd row, 1 d. 3 u., &c.; 3rd row, 3 d. 3 u., &c.; 4th row, 3 u. 3 d., &c.

3rd Step. Two Sub-Patterns in a Mat.—Each is contrasted in *alternate* rows. The numbers as in 2nd step, *e.g.* 1st row, 1 u. 1 d., &c.; 2nd row, 3 u. 3 d., &c.; 3rd row, 1 d. 1 u., &c.; 4th row, 3 u. 3 d., &c.

4th Step. Two Sub-Patterns in a Mat.—There is no contrast between the rows. The numbers as in 2nd step.

5th Step. Transference.—The pattern is shifted to the left and right alternately, *equal* or *unequal* numbers in the pattern.

6th Step. Transference.—In one direction only; or to the left and right after plaiting several rows.

7th Step. Reversion.—Here the *order* of the numbers in the pattern is changed in each row: *e.g.* 1st row, 1 up 3 down, &c.; 2nd row, 3 down 1 up, &c.

8th Step. The Double Pattern.—This double the length of the former, having two or more ups and two or more downs in it (4 or more numbers in a row): *e.g.* 1 up 3 down, 1 up 4 down, &c., 1 down 3 up, 1 down 4 up, &c.

These elements may be freely combined by the children on their "private" mat, as the instructions on the "class" mat proceeds; *e.g.* it is evident many pretty inventions might be made by combining *reversion* with the *double pattern;* or again *transference* with the *double pattern;* or again *transference* with *reversion,* &c.

I recommend teachers to take books with printed patterns and try to analyse some of these in writing. If these cannot be analysed by any known rule, it is evident they ought not to be given as exercises for children to copy.

Some patterns will here be given and analysed as examples.

PATTERN 1.

1st Row.—1 u. 1 d., &c.
2nd Row.—3 u. 3 d., &c.
3rd Row.—1 u. 1 d., &c.

4th, 5th, and 6th Rows.—Transfer the above pattern three strips to the right, thus contrasting the rows in turn, thus—

4th Row.—1 d. 1 u., &c.
5th Row.—3 d. 3 u., &c.
6th Row.—1 u. 1 d., &c.

ANALYSIS.

This pattern consists of two sub-patterns (a row of ones and a row of threes), one of which is repeated. The whole pattern is finished in three rows, when it is transferred three strips to the right and is recommenced. We have here a combination of steps 4 and 6.

PATTERN 2.

1st Row.—3 d. 3 u., &c.
2nd Row.—1 d. 1 u., &c.
3rd Row.—3 d. 3 u., &c.

4th, 5th, and 6th Rows.—Transfer the above pattern to the left continuously.

ANALYSIS.

This pattern consists of two sub-patterns, one of which is repeated, the whole pattern being finished in three rows. It is then transferred one strip to the left and recommenced. We have here a combination of steps 4 and 7.

PATTERN 3.

1st Row.—1 u. 1 d., &c.
2nd Row.—1 d. 1 u., &c.
3rd Row.—3 d. 3 u., &c.
4th Row.—1 u. 1 d., &c.
5th Row.—1 d. 1 u., &c.
6th Row.—3 d. 3 u., &c. Transferred by one strip to the left.

ANALYSIS.

This pattern consists of two sub-patterns, one of which is immediately contrasted (the row of ones), the other (the row of threes) is transferred continuously by one strip; the sub-pattern of threes only appears every third row. We have here a combination of steps 2 and 7.

PATTERN 4.

1st Row.—2 d. 3 u., &c.
2nd Row.—1 d. 1 u., 1 d. 2 u., &c.
3rd Row.—(1 u.) 2 d. 3 u., &c.
4th Row.—(2 u.) 2 d. 3 u., &c.
5th Row.—(2 u.) 1 d. 1 u., 1 d. 2 u., &c.
6th Row.—(3 u.) 2 d. 3 u., &c.

ANALYSIS.

This pattern consists of two sub-patterns (2 d. 3 u. and 1 d. 1 u. 1 d. 2 u.). The first is repeated and shifted by one strip in the third row, the other is a double one having four numbers in it. The whole pattern is finished in three rows, after which it is transferred to the left. We have a combination of steps 4, 7, and 8.

PATTERN 5.

1st Row.—2 u. 1 d., &c.
2nd Row.—(1 u.) 3 d. 3 u., &c.
3rd Row.—2 d. 1 u., &c.
4th Row.—(1 u.) 3 d. 3 u., &c.

ANALYSIS.

This pattern is completed in four rows. It consists of two sub-patterns: the first is contrasted every alternate row, the second is repeated; the first is composed of equal, the second of unequal numbers. We have here a combination of steps 3 and 4.

PATTERN 6.

1st Row.—1 d. 1 u. 1 d. 3 u., &c.
2nd Row.—(1 u.) 1 d. 1 u. 1 d. 3. u., &c.
3rd Row.—(2 u.) 1 d. 1 u. 1 d. 3 u., &c.
4th Row.—(3 u.) 1 d. 1 u. 1 d. 3 u., &c.
5th Row.—(1 d. 3 u.) 1 d. 1 u. 1 d. 3 u., &c.
6th Row.—(1 u. 1 d., 3 u.) 1 d. 1 u. 1 d. 3 u., &c.

ANALYSIS.

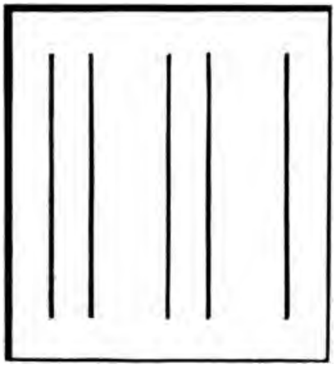
We have only one sub-pattern here (1, 1, 1, 3). It is composed of four numbers, and it is transferred by one strip continuously to the left. We have here a combination of steps 6 and 8.

GENERAL REMARKS ON TEACHING THE ABOVE OCCUPATION.

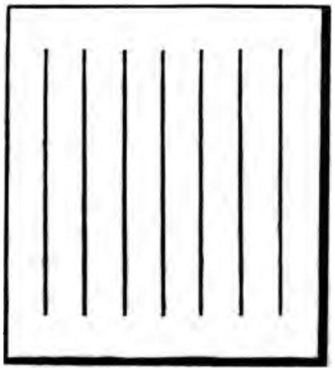
This occupation may be made interesting and instructive to children of any age between four and seven years, and teachers are recommended to introduce it in different stages throughout the three sections of an infant school. All the occupations may be said to give children ideas of number and of combinations of numbers, but this may be urged in a pre-eminent degree in the case of mat-plaiting. When a child has completed Mat No. I. he has plaited four rows, and he has raised, or put down, one strip four times in every row; or, in other words, he has contemplated the number "one" four times multiplied by four, or sixteen times altogether. And all this is accomplished without drudgery; the child is eager to have a pretty mat, and he soon perceives how indispensable a means a knowledge of number is to attain the end. *Form* helps him largely, as in other occupations, in recognising number; for a child notices a mistake in the *pattern* when the slip in the *number* of strips might otherwise remain unperceived. Teachers in elementary schools have sometimes borne their testimony to the good effect this occupation has upon children as a training in number; simple arithmetical propositions, which are familiar when presented to them in *one form*, appear like new matter for investigation when presented in another. Thus children in infant schools, advanced already in written arithmetic, have to make former knowledge doubly their own in solving little problems set in mat-plaiting lessons. This kind of instruction, like every other, must be graduated; the questions we ask must increase in difficulty as the children advance, and a corresponding change in the material will be necessary at each stage. I will here give a short description of the aim to be attained in each of three stages :—

1st Stage.

Mat I.

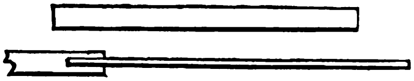


Mat II.



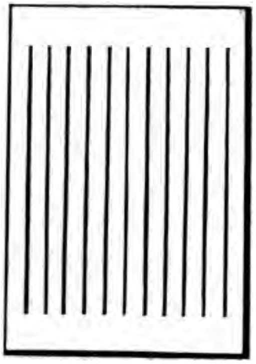
Mats I. and II., which are small and stiff; stiff, loose strips are used which may be interlaced without the aid of a plaiting needle. The children plait lifting *one* strip at a time only; they do not go beyond the number " one," variety being attained by using strips of different colours and of different widths. The idea of " broad " and " narrow strip " is given in connection with Mat I.

2nd Stage.

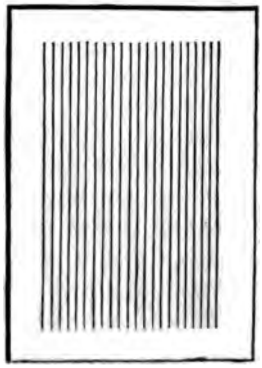


Threading of plaiting needles.

Mat III.



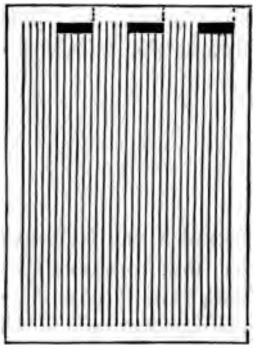
Afterwards Mat IV. Every child has



a paper case which holds *two mats* (1 stiff, 1 thin) of the same degree of difficulty, a needle, and loose strips (stiff and thin) for either mat. The stiff or "class" mat will be found useful for *collective instruction*, all the children performing the same exercise upon it and the same amount of work. One child may prove quicker than another in executing the task prescribed, and whilst the others come up to him he is employed in plaiting the second or "private" mat; this is of thinner material and of some bright colour. A child thus allowed to carry out any little ideas of his own is inclined to look upon the "private" mat as a reward of industry. According to this plan a certain amount of simultaneous instruction is given, and yet scope is afforded for the inventive powers of those children who are most likely to have little ideas of their own. The mats now used are finer, having a greater number of tight strips in them. First, Mat III. (in duplicate) would be used; later on Mat IV. (also in duplicate). The children learn to name the strips in order; they have exercises with *unthreaded* needles, raising any strip named or any number of strips so many times in a row. The patterns plaited at this stage are: 1 up 1 down (varieties of colour and width in the loose strips), afterwards on Mat IV. 2 up 2 down and 3 up 3 down.

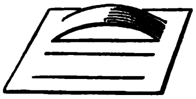
3RD STAGE.

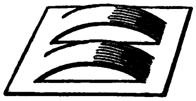
A finer mat than the above (Mat V.) is used in duplicate. The chief difference between this and the former stage is, that the patterns are drawn and *written on the blackboard* by the teacher or children and plaited; again, the *idea of contrast* (in position of the strips) is given, and children learn to recognise the number of times the pattern has been plaited into the mat. They gradually suggest different series of numbers to be combined in the formation of patterns; they learn how to transfer patterns, and having analysed their elements, they are now able to make varied combinations.



EXAMPLES OF MAT-PLAITING LESSONS.

Stage 1st. (in which Mats I. and II. are plaited).—In the first lesson, Mat I. being provided to every child, they would name the material and they would be shown a *finished* "mat," such as they were going to make. The children watch the first steps on the teacher's mat, on a larger scale, but otherwise the same as theirs. She begins, perhaps, by asking them if they have ever watched the trains outside; whether they have seen them disappear under an arch; how they came out again at the other side? She asks them whether they would like to play at making "arches" under which trains can go? She then raises the broad strip in her mat and bends it so as to represent the arch, and being of a stiff material it can be bent so as to remain in that position. She calls that a "big" or "broad" arch. A child finds another such "big" or "broad" arch which is raised and bent upwards, thus:—





The stiff white strip represents the "long" train, and is now pushed "under" the arches successively by the teacher, whilst the children are directed to call out "now" whenever they see it disappear. The children now make "broad arches" on their mats, and a strip is afterwards pushed in in the same way. The teacher may then raise a narrow strip, saying that now another "train" shall pass under the "little" or "narrow" arch. The "narrow arches" having been made, a second strip (train) is passed underneath as before. When the children perceive that the "broad arches" and the "narrow arches" are raised alternately they have learnt the principle of interlacing or plaiting the strips. In order to obtain a little variety in the exercise without confusing the child the loose strips may be of different widths or colours, and thus the pattern may be varied without changing the number "*one* up *one* down."

In Mat II. he has to alternate the position of the strips in the mat without the aid of a change of width. When he can do that he has overcome the mechanical difficulties of mat-plaiting exercises.

Stage 2nd.—A first lesson would be given on Mat III. with needles. The teacher provides herself with a duplicate mat, but only on a *larger scale.* The children will only require a "class mat" in the first lesson; they should be provided with little cases made of rough brown paper.

(1.) Drill (in classes) in opening and shutting portfolios.

(2.) Material enumerated, parts named.

(3.) *Names* of strips in the mat as 1st, 2nd, 3rd, &c., exercises with unthreaded needles in raising strips named.

(4.) Exercise in threading needles.

(5.) Drill (in classes) and shutting portfolios.

Teacher (2.) What have I given you to-day?

Answer. A mat—strips—a needle; these are in a case.*

Teacher (taking up a white loose strip). I will plait this strip into my mat

---

* Great stress ought to be laid upon the manner of answering. One word ought not to be accepted in answer to a question at this stage.

(she does this). Can I pull it out again?

Teacher. Yes, of course I can, it is quite *loose* (a child pulls the loose strip out). There are strips in the mat which cannot be pulled out; can you show me one on my mat?

(A child does this.)

Teacher. Yes. What shall we call a strip which *we cannot pull out* of the mat without spoiling it? (*or a strip which is not loose?*)

Answer. It is a *tight* strip.

Teacher. Lift up a *tight* strip on to your finger. Lift up another.

How many *tight* strips are there altogether in your mat?

How many have you? And you? And you?

Teacher. Those who said they had *ten tight strips* are right.

(3.) The ten tight strips look very like one another, do they not? I think we should not know them unless we gave them each a *name.*

If I were going to plait my pretty mat, with which tight strip should I *begin?*

(A child shows the strip which would be lifted up to *begin* with.)

Teacher. What name should I give to the strip I *begin* with?

(If the children cannot think of the appropriate name, something like this will follow.)

Teacher (taking a book). You, perhaps, can read out of a book; well, what do you call the page at which you *begin to read* in your book?

Teacher. And after reading you, perhaps, are told to march in a long line round the room; the boy, or girl, that *begins to march* and to lead the others round the room would be called by what name? (illustrate this in the case of a number of doors in a street, &c.).

Teacher. Now look at your mats and tell me what name we should give to the tight strip with which we *begin to plait?*

What name should we give to the tight strip that comes *after* the 1st strip?

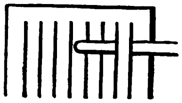
Give me a name for the strip that comes after the 2nd strip?

And for the strip *after* the 3rd?

(And so on.)

Teacher. Take up your needles and look at them. Are the two ends the same?

The needle is used for *lifting up* the strips. The thin end of the needle is put into the mat to lift up the strips, thus:—



Now raise your needles in your right hands, thus: lift up the *1st tight strip* upon your needle.

(The teacher goes round in a class to see that the children understand and carry out her instructions.)

Teacher. Draw out your needles.

Lift up the *2nd strip* in your mats.

(The teacher sees that her instructions are carried out, a mistake, perhaps, occurs, a child lifts up the two first strips upon his needle. The teacher must allow every child in a class to profit by individual mistakes; she takes the faulty mat, and raising it before the class she says something like the following.)

Teacher. How many strips has E. lifted upon his needle?

How *many* did I wish to see upon the needle?

What was the *name* of that one strip?

Can both these strips have that name?

Show E. which of the two has that name?

(A child volunteers the information, the faulty mat is corrected.)

These exercises in naming and raising single strips in the mat are continued for about ten minutes at the commencement of *every* plaiting lesson. They may be varied by asking the children to lift "a strip that comes *after* the 5th, the 7th, the 9th," &c., or else "a strip that comes *before* the 2nd, 4th, 8th," &c. Getting the children to *name* the strip when it has been picked up on to the needles.

(4.) During the last ten minutes the children learn to "thread" their needles with a loose strip. This would be enough for a 1st lesson, the cases would be opened and the material packed away as at first, *e.g.* the teacher takes a case and shows what part must be opened when she says—

(Drill.) "One." (The cases are turned so as to have the opening uppermost.)

"Two." (The flap at the top is opened.)

"Three." (The side flaps are opened.)

"Four." (The large flap is opened.)

"Five." (The mat, strips, and needle are laid inside.)

"Six." (The large flap is shut.)

"Seven." (The side flaps are ditto.)

"Eight." (The top flap is ditto.)

Such an exercise affords pleasure to children when they are together, and order is better maintained in these lessons.

2nd Lesson.—(1.) Drill in opening cases.

(2.) Exercises with unthreaded needles as before.

(3.) Threading needles.

(4.) The first four rows in the mat are plaited to dictation.

(5.) Drill in shutting cases.

Teacher. (2.) Let me see if you can remember the names of the tight strips in our mats. Raise your needles in your right hands, thus. Lift up the 3rd strip, the 5th, the 9th, the 10th, &c. Lift up a strip that *comes after* the 6th strip, one that *comes after* the 2nd strip; what name has it? Did I tell you its name? Lift up a strip that *comes before* the 2nd strip. By what name shall we call it? &c.

(3.) Thread your needles with a loose strip and hold them up in your right hands. Are all ready?

(4.) When a pretty mat is to be made we must begin by lifting up a tight strip. What is its name?

Which strip shall we lift up after the 1st strip?

(A child answers, the 2nd strip, but as every one in the class is only practically acquainted with the pattern "1 up 1 down," we assume for the time being that no other number is possible.)

Teacher. Would it look pretty to lift up the 2nd strip *as well as* the 1st?

Teacher. No, of course not; we must *leave the 2nd strip alone;*[*] what shall we do with the 3rd strip? And what shall we do with the 4th strip?

Answer. We *leave it alone.*

Teacher. Yes, and we go on taking up one strip and leaving one alone, and taking up one strip and leaving one alone, till we come to the end of the row.

Now tell me once more what we shall do with the 1st strip in this row? And what with the 2nd? And with the 3rd? And with the 4th?

Do this to the end of the row.

(When the 1st row is plaited the children thread their needles, but they must wait for the word of command to begin the 2nd row.)

Teacher. Have you all drawn one white loose strip into your mats? Are you ready to begin another row?

Which tight strip must we *lift up* at the beginning of this row? Would it do to lift up the 1st strip again?

Well, let us lift up the 2nd strip to begin with; what shall we do with the 3rd strip this time? And with the 4th? And with the 5th? And with the 6th?

Now let me see if you remember which strips are to be lifted up in plaiting this row.

Answer. The 2nd, 4th, and 6th strips must be lifted up.

Teacher. Do this, and go on to the end of the row.

(The next two rows are plaited to dictation in the same way.)

(5.) Drill in packing away the material.

3rd Lesson.—(1.) Drill in opening and shutting portfolios.

(2.) Exercises with unthreaded needles.

(3.) Plaiting two new rows *to dictation* and four rows *in silence.*

(4.) Private mats.

(5.) Drill.

(Remark: The above lessons begun on Mat III. would be continued on Mat IV.)

(1.) *Teacher.* Can you remember what I mean by saying "one"? And do you understand me when I say "two"? &c.

Let me see now if you can all remember what to do, without my having to show you. "One," "two," "three," "four," "five," "six," "seven," "eight."

(2.) Raise your needles in the right hand; lift up the 1st and 2nd strips; draw out your needles. There were no mistakes this time; let me see if there will be no mistakes at all to-day.

Lift up the 9th and 10th strips. Draw out your needles.

(A record is made of the number of mistakes in a portion of the class, if many children are present.)

Teacher. Lift up two strips that *come immediately after* the 1st strip. What are their names?

Lift up two strips that come *immediately after* the 3rd strip. What are their names? &c.

(3.) Now thread your needles for

---

[*] This is easier than to introduce *two* ideas, those of "up" and "down," in the same lesson. The children's attention is for a time concentrated on the strips that are *lifted up on* the needle.

"two" of strips? The second "two" of strips? &c.

(5.) (One row of "twos" having been correctly plaited into the class mat, the private mats are taken out for the remainder of the lesson.)

(6.) Drill.

15*th Lesson.*—(1) Drill in opening cases. (2) Counting and naming the "twos" in the second row, with unthreaded needles. (3) Plaiting three rows to dictation and two or more in silence. (4) Private mat. (5) Drill as before.

16*th Lesson.*—(1) Drill as before. (2) Exercise with unthreaded needles: lifting up "threes" and putting down "threes." (3) Threading of needles: continuation of former pattern to the end of the mat. (4) Recapitulation on pattern, 2 up 2 down. (5) Drill as before.

(1.) *Teacher.* "One," "Two," &c.

(2.) *Teacher.* Tell me how many tight strips there are in the mat?

Teacher. How many times can you plait "twos" into a mat with 15 tight strips?

Thread your needles. How many rows have you plaited?

Which row are we about to begin.

Where shall we put the first "two" of strips?

Plait a row of "twos," leave the white, loose strip in the mat, and thread your needles.

Which row are we about to begin?

Where must the first "two" go? (Up or down?)

Plait to the end of the row.

Where is the first "two" in the row just plaited?

Where is the second "two," the third "two"? &c.

Teacher. Are there any strips you cannot make a "two" of?

Teacher. We say then, "One strip is over."

Teacher. Which "twos" are lifted up in the first row?

Answer. The 1st, 3rd, 5th, and 7th "twos" (the pattern is then finished in silence).

17*th Lesson.*—A fresh class mat, No. IV. (1) As usual. (2) Exercises with *unthreaded* needles—"threes" and "fours" in a row. (3) With threaded needles: pattern 3 up 3 down. (4) Private mat. (5) Drill as before.

18*th Lesson.*—(1) (2) Exercises with unthreaded needles: recapitulation. (3) With threaded needles: 3 up 3 down plaited. (4) Private mat with two widths, or else two colours in the loose strips. (5) As before.

19*th Lesson.*—(1) (2) Exercises with unthreaded needles: "fives," "sixes," and "sevens" in 15 tight strips. (3) With threaded needles: pattern continued. (4) Private mat as before. (5) As before.

20*th Lesson.*—(1) (2) Exercises with unthreaded needles: "eights," "nines," "tens" in twenty: recapitulation. (3) With threaded needles: 3 up 3 down finished on the class mat No. IV. (4) Private mat finished.

(It may not be found possible to divide the exercises into the same number plaiting; hold your needles thus threaded in the right hand.

How *many rows* have you plaited?

What strips of the mat were *lifted up* in the first row you plaited?

(The uneven numbers are named as far as ten.)

What tight strips did you *lift up* in the second row?

(The even numbers will be named.)

What *row* are we going to plait now?

What strips will you take up in this row? (The first three must be named at least, gradually all those that are lifted *up on* the needle will be named.) Do this and finish the row.

How many rows have been plaited altogether?

Which row are we about to begin?

Name the *tight strips* that must be *lifted up?* Do this.

Name the *tight strips* that are *not lifted* up?

Thread your needles for the next row.

How many rows are plaited into your mat?

Now I should like you to do the next row *quietly, by yourselves.* Hold your needles up when you have finished.

(The teacher goes round to see if there are any who have made mistakes; when they occur they must be corrected in front of the class.)

Teacher. How many "ones" of strips have you altogether in a row?

Teacher. Could we take up another number besides "ones" of strips?

Could we *leave* another number besides "*ones*" of strips?

Teacher. Yes, of course we could take up two strips that are close together; we could leave two strips that are close together.

Teacher. Let us do this. Lift up two strips, leave two strips—lift up two strips, leave two strips.

What shall we do next? What next? What next? &c.

Leave your needles sticking in the mat until I come and look at them.

How many "twos" of strips have you lifted up on to your needles?

How many "twos" of strips are *not* lifted up?

How many "twos" of strips have you altogether in a row?

Now draw out your needles and do that again without my help.

Where is the first "two" of strips?

Answer. Upon the needle.

Where is the *last* "two" of strips?

Put your finger upon the "two" that is next to the first "two" of strips.

What shall we call that "two" of strips?

Where is the second "two" of strips?

Put your finger on the third "two" of strips.

Ditto on the fourth "two" of strips, on the fifth "two" of strips, &c.

Teacher. Now draw out your needles and thread them.

Plait a row of "*twos*" of strips into your mats, lifting up the first "two" of strips upon your needles.

(One row having been finished.)

Teacher. Look at my mat (on a large scale); of what *colour* is the first "two" of strips?

Of what *colour* is the last "two" of strips?

Look at your mats; of what colour is the first "two" of strips? The last "two" of strips? The second "two" of strips? &c.

(5.) (One row of "twos" having been correctly plaited into the class mat, the private mats are taken out for the remainder of the lesson.)

(6.) Drill.

15*th Lesson.*—(1) Drill in opening cases. (2) Counting and naming the "twos" in the second row, with unthreaded needles. (3) Plaiting three rows to dictation and two or more in silence. (4) Private mat. (5) Drill as before.

16*th Lesson.*—(1) Drill as before. (2) Exercise with unthreaded needles: lifting up "threes" and putting down "threes." (3) Threading of needles: continuation of former pattern to the end of the mat. (4) Recapitulation on pattern, 2 up 2 down. (5) Drill as before.

(1.) *Teacher.* "One," "Two," &c.

(2.) *Teacher.* Tell me how many tight strips there are in the mat?

Teacher. How many times can you plait "twos" into a mat with 15 tight strips?

Thread your needles. How many rows have you plaited?

Which row are we about to begin.

Where shall we put the first "two" of strips?

Plait a row of "twos," leave the white, loose strip in the mat, and thread your needles.

Which row are we about to begin?

Where must the first "two" go? (Up or down?)

Plait to the end of the row.

Where is the first "two" in the row just plaited?

Where is the second "two," the third "two"? &c.

Teacher. Are there any strips you cannot make a "two" of?

Teacher. We say then, "One strip is over."

Teacher. Which "twos" are lifted up in the first row?

Answer. The 1st, 3rd, 5th, and 7th "twos" (the pattern is then finished in silence).

17*th Lesson.*—A fresh class mat, No. IV. (1) As usual. (2) Exercises with *unthreaded* needles—"threes" and "fours" in a row. (3) With threaded needles: pattern 3 up 3 down. (4) Private mat. (5) Drill as before.

18*th Lesson.*—(1) (2) Exercises with unthreaded needles: recapitulation. (3) With threaded needles: 3 up 3 down plaited. (4) Private mat with two widths, or else two colours in the loose strips. (5) As before.

19*th Lesson.*—(1) (2) Exercises with unthreaded needles: "fives," "sixes," and "sevens" in 15 tight strips. (3) With threaded needles: pattern continued. (4) Private mat as before. (5) As before.

20*th Lesson.*—(1) (2) Exercises with unthreaded needles: "eights," "nines," "tens" in twenty: recapitulation. (3) With threaded needles: 3 up 3 down finished on the class mat No. IV. (4) Private mat finished.

(It may not be found possible to divide the exercises into the same number of lessons, as much will depend upon the length of the lesson, the degree of intelligence in the children, &c. But at any rate children would be able to master these exercises within the year, and would be prepared to begin the)—

3rd Stage.—Material: class mat V. with 30 strips, needles, strips, private mat, and strips.

1st and 2nd Lessons.—Upon the idea of *contrast* or *opposite* in the *position* of various objects.

Teacher (taking a book, a slate, a glove, or anything near, and placing it upon a chair, she says). Where is that book?*

Answer. The book is *upon* the chair.

(The class repeats this.)

Teacher. How *many words* have you given me in answer to my question?

Now I should like you to give me *many words* in answer to my question, because you are big children.

Teacher. Could you put that book in the *opposite* place to "*upon the chair*"?

(If the children do not readily think of the opposite to *upon*, then the following exercise with the arms is practised.)

Teacher. Put your hands *upon* the desks.

Can I see your hands?

Teacher. Yes, I *can* see them. Who can find a place about the desk to place the hands where I *cannot* see them?

Where have you put your hands now?

Answer. My hands are *under* the desk.

Teacher. Now place your hands once more where I *can* see them. Where are they now?

Answer. My hands are *upon* the desk. (This exercise may be repeated once or twice.)

Teacher. We call "*under* the desk" the *very opposite place* to "*upon* the desk."

Now place my book in the opposite place to "*upon* the chair."

(A child does this.)

Teacher. Name something that is "*over* our heads."

Name something that is *under* our feet.

Teacher. Where is the opposite place to *under* our feet?

Where are we all at this moment?

Answer. We are *in* (inside) the schoolroom.

Teacher. Let a child who knows where to go, go to the opposite place to "*in* the schoolroom."

(A child does this.)

Teacher. Where has A. gone?

Answer. A. has gone "*outside* the schoolroom."

Teacher. And now that he is *outside* the schoolroom, supposing we were to tell him out there to go to the *opposite* place, where would he go?

Teacher. Of course, if he heard that *outside*, he would run *into* the schoolroom again.

(This is done and the child returns.) Further illustrations in finding the *opposite* or the contrary in position may be given—*e.g.* far and near, right and left, back and front, &c.

---

* **Children must answer in complete sentences at this stage.**

3rd Lesson.—The same continued.

Teacher. You told me the other day, in answer to my question, that we were "*inside* the schoolroom." What *other place* did that make you think of?

And again, in thinking of the place "*over* our heads," did that make you think of any *other place?*

And again, in pointing to the place called the "*left*," did that make you think of any *other place?*

Teacher. Two places that *we think of about the same time*, like "left" and "right," "up" and "down," are called "*opposite places.*"

Now take out your class mats out of the cases. Take your needles, thread them, and plait a row of "fives" into the mat.

How many "fives" are there in the row?

Are the "fives" in the same place?

Answer. Some "fives" are *upon* the needle, some "fives" are *under* the needle.

Where is the first "five"? And the second?

Now tell me which two "fives" are in "*opposite places*" to one another?

Name other two "fives" that are in "*opposite places*" to one another?

Name other two "fives" that are in "*opposite places*" to one another?

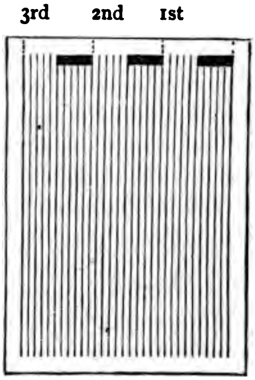
How many *pairs of fives* does that make altogether?

Now when we have *plaited two fives in opposite places*, into our mat, we say: *We have* plaited "the pattern" once across our mat.

Teacher. How many times have you put *two fives into opposite places*, in the row just plaited?

Teacher. How many *times has the pattern* been plaited across the mat in the first row?

Teacher. We shall *draw a picture* of the patterns in the first row of the mat (A chequered blackboard is necessary for this.) Show me the place where the pattern ends for the first time. Show me the place where the pattern ends a second time. Show me the pattern as many times as it occurs in the row. (The teacher writes.)



First row: 5 d. 5 u.—5 d. 5 u.—5 d. 5 u. What does this mark (—) mean? Have you seen it before?

Read (simultaneously) what I have written, paying attention to these (—) marks.

Teacher. How many times have I written the pattern?

Show me a *written pattern once.* Show me another *written pattern.* And another.

How many *numbers* are there in the pattern?

What do we know about the *place* of those two numbers in the pattern?

Answer. They are in opposite places.

(The remainder of the lesson may be suitably taken up in copying the *picture of the mat* on to the small slates, the pattern being filled in in the first row and the number of times which the pattern occurs is marked off.)

ANOTHER LESSON.

Recapitulation and Continuation of the Last Pattern.

Teacher. How many numbers are there in the pattern?

What were those numbers in the pattern we plaited?

Who can write the pattern from memory on the blackboard? Make a mark each time the pattern ends.

How many times has the pattern been plaited across the mat in that row?

How many tight strips are occupied each time the pattern is completed? (5 + 5 = 10) Ans.

Thread your needles and plait the second row.

Teacher. I will *draw a picture* of the second row.

Who can *write* out second row on the blackboard?

(A child does this.)

Where does the pattern end for the first time in this row? Where does it end for the second time? And for the third time?

Draw the pattern in the second row on to your slates. (In doing this the *inside edge* of the mat only is drawn, and a check, or square, is calculated for each strip.)

The above exercises would be continued with this pattern. As the children begin to show proficiency in counting the number of times the pattern occurs, the *old* mats, already plaited, may be taken to hand; thus the children are all supplied with *finished* mats with the pattern 2 up 2 down in them and the pattern is *drawn*, the number of times the pattern is completed is marked off in a row, as before; three or four rows of the pattern are *written*. The old pattern "1 up 1 down," &c., is dealt with in a similar way. When the idea of the contrast of positions of the strips is completely understood in connection with these old patterns, it may be applied to those patterns in which we have *unequal* numbers in the short divisions, *e.g.*—

Teacher (writes). 1 up 3 down, 1 up 3 down, &c. What is the pattern?

How many times can I plait that pattern into a mat with thirty tight strips?

Do one row of that pattern.

Where does the pattern end for the first time? (shown on the blackboard). And for the second time? &c.

How many *numbers* are there each time in the pattern?

What do we know respecting *the place* of these two numbers?

How many times is the pattern plaited in one row?

How many tight strips are occupied each time by the pattern?

Is the pattern once left *unfinished?*

How many tight strips are over? &c.

The above pattern would then be plaited and the mat is finished.

The next step would be to count *the patterns lengthways* in the mat. After the children have seized the idea in connection with old patterns, they might practise plaiting two rows, taking *a colour* for every two rows.

For the continuation of the series of exercises see page 89.

STICK-LAYING.

EXERCISES FOR LESSONS IN NUMBER AND FORM.

IN watching how little children acquire their first perceptions of number in connection with things about them, we readily perceive that, according to the principle of antithesis, they begin by perceiving the difference between *one* and *more than one*, or, in other words, between the singular and plural. When a child attaches a *definite meaning* to the word "two," he has made a great step in advance; he must have implicitly *increased* and *decreased* known quantities, and he must have *compared* these. But a little child, in doing all this at the very outset, may be said to have anticipated his teachers: he has not been taught any one "operation" as yet, and he practically applies them all to the number "two." This fact should be a guide to us in the early stages of arithmetic. The various operations, such as addition, subtraction, multiplication, and division, are not naturally separated and held apart, as they appear in scientific treatises on the subject: in "division" we *compare*, in addition and multiplication we *increase*, and in subtraction we *decrease* quantities; consequently all these are so many modes of the mind's working in order to arrive at a knowledge of any one number. Instead of starting with the idea of teaching an "operation" which we apply to *many* numbers, let us rather restrict ourselves to *one number* until it is thoroughly known, at the same time applying the various operations of addition, subtraction, multiplication, and division to that unvarying total. Children thus acquire a ready power over small numbers, which is the only real basis for *written arithmetic*. Again, "Form" ought to come in for a share of attention in "Number" lessons. The "three sticks" or "five sticks" might appear to children not only as "three ones" or "five ones," but also as "*one* three" and "*one* five" —in fact, as *wholes*. This is easily done in "stick-laying" exercises: thus the "cross" + represents the two sticks as a *whole*, the "triangle" Δ represents three as a *whole*, &c. Children who are thus accustomed to look upon small numbers as *wholes*, will not encounter any difficulty in looking upon "ten ones" as "*one* ten." When exercises in number have been performed by the children with sticks, they should be repeated *from memory* at the beginning of the next lesson, before any new numbers are dealt with.

In the second stage of stick-laying exercises a knowledge of the first nine ciphers is gradually interwoven with the stick-laying exercises, children having both sticks and slates in the same lesson. It is, however, supposed that notation and the performing of addition or subtraction sums on the slate are postponed until the end of the fifth year. Such exercises as those given on pages 114, 115, 116 are not intended by a single application to *initiate* a long process of abstract reasoning. They ought to have *a value in themselves* in the eyes of teachers. They may properly be called "*Exercises in translating*" concrete quantities into their respective symbols, and this *act of translation* requires *frequent repetition* for some time after the *rationale* of the symbols has been *apprehended.* Exercises like the one given ought, therefore, to be continued with a view to bringing out the *close reciprocity* between the concrete quantities and their symbols, and they may run parallel with instruction in mental arithmetic.

Children thus prepared will not have much difficulty in mastering the decimal system of notation, and in performing easy addition and subtraction sums within the space of a year. And what is of more value, they will bring an amount of intelligence to bear upon their work which is often left behind in the early stages of the process. For example, a child who can write from dictation the number seven hundred and sixty-three, should be equally able to recognise the quantity under the form seventy-six tens and three ones. To teach children notation after such a manner, that they shall hit upon the right thing in the first instance, and yet be utterly non-plussed in the second, seems to indicate that we may teach them a species of arithmetical jugglery without permanently strengthening the reasoning faculties through the processes of arithmetic. They learn to set a certain machinery in motion blindly, the nature of which they know little, and which the accident of an examination, even, may put out of order.

The exercises in the occupation of stick-laying will be best understood by dividing them into three stages, namely:—

Stage 1.—Sticks of one length not exceeding ten in number.

Stage 2.—As above not exceeding twenty in number; introduction to the cipher and to notation (both sticks and slates are used in each lesson).

Stage 3.—Stick-laying exercises prepare the way for drawing more especially. Sticks of different lengths are used so as to lead up to the 2nd stage of the geometrical drawing exercises (see Drawing, page 160).

Further illustration of the use to which this occupation may be put will be given by means of examples of lessons in different stages. Although I have dwelt upon those exercises which would fall under Group C, it is evident that they may be used in following up the *object instruction* (Group A), or they may be used for forming *designs* (Group B).

EXAMPLES OF LESSONS IN STICK-LAYING.

1ST STAGE.

Material.—Each child is provided with a little heap of sticks of one length, five in number.

Subject of the Lesson.—Idea of the Number *Two.*

Teacher (drawing a form to be made with two sticks on the black board). Are you pleased when I draw something on the blackboard?

What name should you give to this pretty thing? (she draws a cross thus +).

How many crosses have I drawn?

Could you make *one* pretty cross with sticks?

Could you make *another one* cross? Do so.

How many crosses do *one cross* and *another one* cross make altogether?

How many *crosses* have you therefore on the table?

Take away one *cross* and hide it in the bundle of sticks before you. How many *crosses* can you see?

How many *crosses* have you taken away?

Take away another one cross. How many *crosses* have you left?

How many *crosses* have you taken away altogether?

How many times have you taken away *one cross?*

Teacher. Now look at my big board. I will draw something. You must guess what I am thinking of, I will not tell you (the letter **V** is drawn).

Answer. That is the letter **V**.

Teacher. Can you write "letter **V**'s"? I see you can read them. We will now lay *one* "letter **V**" with sticks. Lay another one **V** with sticks.

Teacher. How many more "letter **V**'s" have you than I have?

How many "letter **V**'s" have you altogether?

Whether had you more "crosses" or more "letter V's"? Can you remember?

Take away *one* "letter **V**" and put it into your heap of sticks. How many *sticks* did you put away?

Take away another one "letter **V**"; how many "letter **V**'s" have you taken away?

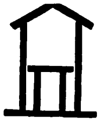
(Exercises on the Number 2 are continued on the same principle until the children know *everything* about two, *i.e.* $1 + 1 = 2$; $2 - 1 - 1 = 0$; $2 : 2 = 1$; $2 \times 1 = 2$, &c. The lesson would be concluded with some such conversation. Supposing the children have heard much during the week about a dog in their little object lesson, the teacher might say something like this)—

Teacher. Do you remember who "Carlo" was? (the children remember the picture, or better still if they are familiar with the reality).

Teacher. Where do you think Carlo sleeps when he goes home?

Children. In the house! In his little house!

Teacher. Yes, he does; his house is called his kennel. Do you think you could make anything like his kennel with all your sticks? (this is done either with or without the teacher's help).



Teacher. How many sticks have we used for the roof? For the sides? For the floor?

One day Carlo was sitting on the doorstep. He was watching the passers-by. All at once Carlo saw his master in the street. With how many eyes did Carlo see his master?

How many tails would Carlo wag to say he was pleased? The master came up to Carlo, patted him on the head, and said, "Good dog Carlo, good dog!" Carlo heard that with how many ears? Carlo's master had just come from dinner. He had a bone in his hand for Carlo. Carlo began to gnaw it with how many mouths?

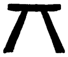
On the Number Three.

Material.—Nine sticks of one length may be given, or even more if the children are accustomed to keep a little heap of sticks beside them, and to take as many as are required only.

Teacher. Do you remember the names of any "pretty things" we made in our last lesson?

How many pretty crosses did you lay upon the table? (Two pretty crosses.)

Teacher. Let me see if I can draw any "pretty thing" on my blackboard (draws).



Can you give that thing a name?

How many "stools" have I drawn?

Could you make *one* "pretty little stool" to sit down upon with your sticks? (this is done).

Could you make more "stools"? Well do so *until all the sticks are done.*

Have you got two stools?

How many stools have you besides?

What is the name for "two stools" and "one stool"?

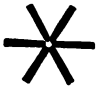
"Three stools" are how many more than "two stools"?

Take away two of those little "stools." How many remain?

How many have you taken away?

Put the two "stools" back again; how many stools are there now altogether?

Let us make something else. The teacher draws the following figure perhaps:



Teacher. What do you think I was thinking of when I drew that? (a "star").

Teacher. With how many *lines* did I draw my "star"?

With how many *sticks* could you make a pretty little "star"?

Try and make a pretty little star. Now make as many as you can like that one, *until all the sticks are done.*

How many pretty little "stars have you made?

Take away *one* little "star" from *three* little "stars."

How many "stars" are there now?

Take away another one "star." How many "stars" are on the table? How many "stars" are hidden away? Take away another one "star." How many are left? How many "stars" did you take away *each time* I told you?

Whether had you more "stars" or more crosses when you made them the other day?

Whether had you more "stools" or more "stars"?

How many *sticks* did you use to make a little "stool"?

How many *sticks* did you use to make a "star"?

Have you ever seen the real little "stars"?

I know a little girl who was very little; she was too little to come to school—she was two years old. One evening it was dark and her mother was putting her to bed. Just before putting her little girl into bed, mother took her in her arms to the window. She drew aside the window curtain and told Annie (that was the name of the little girl) to look out. Annie looked up to the sky and she saw something very pretty. I am sure you would have been pleased to have seen what Annie saw.

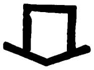
Children. A star! A star!

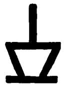
Teacher. Yes, Annie saw a pretty little star, and very near it another star and another star. Annie was delighted to see them, and she called the two biggest stars "papa" and "mamma stars," and the little star beside them, her mother told her, was the little "baby" star. Annie did not wish to go to bed for a long time, but her mother told her she must go to bed; so Annie kissed her hand once to the "star papa," and once to the "star mamma," and once to the "baby star," and bade them good night. Then Annie's mother tucked her into her cosy bed and she soon fell fast asleep. The next morning Annie awoke and she remembered the stars; she ran to the window quickly, but, alas! the stars were no longer there. Another day you shall hear how Annie saw the star family again. (Twinkle, twinkle, little star, &c.)

(Lessons would be given on the Numbers 4 and 5 in the same way.)

Lesson on the Number Six.

Teacher. Do you remember what "pretty things" we made last time? (a hat, a flower-pot, &c.).





How many sticks did you require to make one of these?

Take five sticks out of your bundle. Now take one more and lay it beside the five. What is the name for five sticks and one stick?

Lay the six sticks in a little heap in front of you. Now look at the figure as I draw it on the blackboard (Δ, a triangle, or with little ones a "roof").

Teacher. How many sides has a triangle?

With how many sticks can you make a triangle?

How many triangles can you make with six sticks? (If the greater number answer at random, the teacher allows them to make triangles.)

How many times have you used three sticks?

Take away a triangle, lay the sticks in front of you. How many sticks have you taken away?

Take away another triangle. How many sticks have you taken away this last time?

How many times have you taken away three sticks?

How many sticks had you altogether?

How many sticks do you use in making a little "stool"?

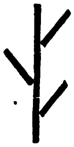
How many "stools" could you make with six sticks?

How do you know that?

Tell me what other "things" you could make *two* of, using *all your six sticks.*

I shall tell you something about a little boy and girl. Their names were Tom and Mary. They were sitting at the window looking out at the snowflakes as they fell thick and fast outside. The whole garden was white, even the window sill was covered. Presently they saw how a dear little robin hopped on to a twig on the tree opposite the window. He had such a pretty red pinafore on and he could see the children with his black little eye. "Tom," said his mother, "that poor little robin is looking for crumbs; should you like to open the window and clear the snow away? Mary can then strew some crumbs on the sill. Perhaps robin will come to the window to fetch them."

Tom was delighted. He ran for his wooden spade; he came back, opened the window, and scraped away the snow. Mary had prepared the crumbs meanwhile, and then she strewed them on the window sill outside. The window was shut, and Tom and Mary hid behind the curtains and held their breath, they were so afraid that robin would not come to the window for the bread crumbs. But robin flew from the tree to the window, where he very soon made a good dinner on the bread crumbs. After that he flew away, but the next day he came and perched himself upon the tree, looking to see if the children had put out any bread crumbs on the window sill. I will show you the *tree* upon which little robin sat. (Teacher draws.)

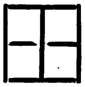


How many sticks could you make the tree with?

How many sticks shall we use for the stem?

How many for the branches?

Should you like to see the *window* at which robin got his dinner of bread crumbs? (Teacher draws.)



How many sticks shall you use to make the window? &c.

On the Number Six.—Continuation.

Teacher. Do you remember how many little sticks we took out of our bundles to work with in the last lesson?

Can you name me *one* "pretty thing" we made with six sticks? Can you name me another?

How many "pretty things"* did we make at a time with *three sticks* in each?

Now let us make *two* "pretty things" once again, using *six sticks* in all. (Teacher draws.)

* A child's term.

With how many sticks do you make *one* chair?

Now you may make what you like for the other "pretty thing."

Teacher. Mary has laid a + beside her chair. How many sticks has she used for the cross?

John has laid the letter **T**. How many sticks has he used?

How many "pretty things" have you got?

Take away the last thing you laid. How many sticks have you put away?

Now put away the chair. How many sticks have you put away?

How many sticks had you altogether in the two "pretty things"?

What two numbers of sticks have we just been working with that together make six?

Teacher. Four sticks are how many less than six?

Two sticks are how many less than six?

On the Number Six.—Continuation.

Teacher. Do you remember the little cross we learnt to make with sticks?

A little boy I knew had a bird in a cage. The bird was called a jay, and it amused the little boy, because it used to make a great many funny noises. It even pretended it could talk. One day I heard the little boy crying bitterly; he said, "Oh, dear! my poor jay is dead!" He took the poor bird out of the cage, his mamma gave him a little box in which buttons were kept from her work basket. The little boy made a soft bed in the box with the threads he had frayed that morning and put the poor dead bird into it. He then dug a hole in the garden, just big enough to hold the box. He covered the box with earth until it made quite a little mound. He then ran and fetched two sticks; these he crossed. The carpenter lent him a hammer and a nail, and he hammered the nail through the sticks, just where they crossed one another. Then he ran and stuck the + in the ground, just at the place where his dear bird lay. So when anybody passed, they saw the cross, and they said, "Look, there lies the poor jay." The little boy often spoke of his dear jay. Have you all made crosses for the dead jay? Make as many as you can with your six sticks. How many crosses have you made?

How many times have you used two sticks?

How many **V**'s could you make with six sticks? How many **T**'s? How many **X**'s?

How do you know you can make three of each of these letters?

How many "ones" of sticks are there in six sticks?

How many "twos" of sticks have you in six sticks?

How many "threes" of sticks are there in your bundle of six sticks?

How many times can you use four sticks?

How many are there besides?

2ND STAGE.

On the Number Thirteen.

Material.—Thirteen sticks of one length (1 inch) are distributed to each child; blackboard and chalk.

Teacher. We shall lay this heap of sticks before us in a long row. Count them aloud as you lay them down. Say a number for each stick (class counts simultaneously, "One—two—three—four").

Teacher. Stop! How many sticks are there in your row? Continue.

(Class: "Five—six—seven—")

Teacher. Stop! How many sticks are now in the row? (She ascertains that every child suits the action to the word and checks any mistake. Then the class continues: "Eight—nine—ten—eleven—twelve—")

Teacher. Stop! How many sticks have you laid down altogether?

Can you lay down any more?

How many sticks did you lay down in a row last time?

How many have you besides?

Lay that one stick beside the others.

What is the name for twelve sticks and one stick? (If the children do not know the teacher tells them: *thir-teen* which really means three-ten.)

The children in the first row of desks (pointing) shall lay thirteen sticks like a row of slanting lines; the children in the second row can lay a row of even-along lines; the children in the third row shall lay their sticks like a row of straight-up-and-down lines. Have you remembered in what position your sticks are to be, in each row?

How *many slanting* sticks have you?

How *many straight-up-and-down* sticks have you?

How *many even-along* sticks have you?

"*Thirteen*" sticks is just another way of saying "twelve sticks" and how many?

Take one stick away from thirteen sticks. How many are in the row? Twelve sticks is one less than what number?

Put back one stick into the row.

Take away one stick at a time until they are all away; say "one" for every stick. (Class aloud: "One—one—one—one—one—one—one—one—one—one—one—one—one—")

Teacher.—How many times have you *said* "one"?

How many times have you *taken away* "one"?

Could you have taken away as many "ones" if I had given you twelve sticks?

How many "ones" are there in thirteen sticks?

Lay your thirteen sticks out in as many "crosses" as you can, with *two sticks in every cross.*

+ + + + + + —

Teacher. How many "*crosses*" have you?

Which comes first?

Which is the second?

Which is the third?

Which is the fourth?

Which is the fifth?

Which is the sixth?

Have you a cross unfinished?

Teacher. How *much* of the cross is laid?

How many sticks are in *half* a cross?

How many *whole* crosses have you?

How many *sticks* are in one *whole* cross?

How many sticks are there in two whole crosses?

How many sticks are there in three whole crosses?

How many sticks are there in four whole crosses?

How many sticks are there in five whole crosses? &c.

How many sticks are there in six whole crosses?

How many sticks are there in two and a half crosses?

How many sticks are there in five and a half crosses? &c.

(These exercises are to be repeated with other figures requiring *two sticks in each*, such as different letters, right angles, obtuse angles, acute angles, the latter if they are familiar to the children.)

How many sticks have you in all?

How many times have you used "two sticks"?

Teacher. Say "two sticks" as many times as you have used two, Mary. (To the class) Has she said "two sticks" for every time?

How many times did you hear her *say* "two sticks"?

How many "one sticks" would that make?

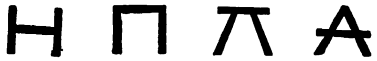
How many are there besides?

What number of "twos" and a "one" make thirteen?

Another Lesson.—Continuation.

Teacher. Tell me how many sticks we should take out of our bundle? Do so.

Let us make as many pretty things with three sticks in each. Willie has made a bed, a table, a stool, the letter A. Let us imitate him.



How many different things have we laid?

How many sticks have we used for the "bed"?

How many sticks have we used for the "table"?

How many for the "stool"?

How many for the letter "**A**"?

How *many times* have you used "three sticks" for all these things?

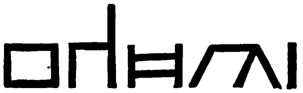
How *many times* have you used "three sticks" in making "the stool" and "the letter **A**"?

How many *sticks* are there in three of these objects? In four objects?

Have you used *all* your sticks?

Could you use *all* your sticks when you made things with three sticks in each?

Teacher. Try now to make things *with four sticks in each.* When I see a row of pretty things I will draw them on the blackboard. Here they are:—



Can you give me *names* for these?

How many sticks are there in the "square"?

How many sticks are there in the "chair"?

How many sticks are there in the "gate"?

How many sticks are there in the "roof"?

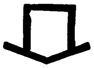
Have you used *all* your sticks in making things with four sticks in each?

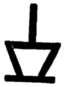
How *many times* have you used *four* sticks?

How many sticks are over? How many altogether?

I wonder if we can make things with *five sticks in each*, and yet use *all* our sticks. Try this.

Teacher. Mary has made these. Can you name them? (A "hat"—a "flower-pot.")





Teacher. Let us copy these.

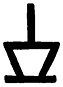
How many *things* have you made?

How *many times* have you used *five sticks?*

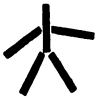
Could you make another thing with five sticks without spoiling these? Why not?

How many sticks are wanting to make another five?

Teacher. When we have used five sticks to make a



and another five sticks to make a little

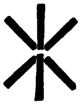


and when we have not got enough to make another thing with five sticks, we say the *five sticks do not go exactly into* the thirteen sticks.

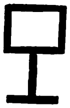
Teacher. Let us make things with *six sticks in each.*

How *many things* have you made? Annie has made pretty things; we shall copy hers this time. What is this?

(*Answer.* A "star.")



Teacher. And this?



(*Answer.* The "ball-frame.")

(The children copy these.)

Teacher. How many *things* have you made?

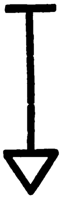
How many sticks are in each thing?

How many times have you used six sticks?

Do the *six sticks* go exactly into the thirteen sticks? How many are over?

Lay things with *seven sticks in each;* let none of the sticks be left over if you can help it.

Teacher. Let us make this "spade." Can we make another?

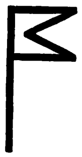


How many sticks are there in one "spade"?

How many sticks are over? What shall we say of the number a seven of sticks?

(Objects may be laid with eight or nine or ten sticks in each in the same way, with a view to making the children understand what is meant by one number being *contained* in another. The objects have always been made with the *same number in each;* we may now have *unequal numbers* in two things, *e.g.*)

Teacher. Lay only *two things* with all your thirteen sticks. The first thing is like this:—



Give it a name?

With how many sticks is it made?

You must find the other thing for yourself; you must use all the sticks that are left.

What have you made, Mary? And you, Annie? And you, Willie?

How many sticks have you used? And you? And you?

How many sticks are in your two things altogether?

Name the two numbers we have just used to make thirteen? &c.

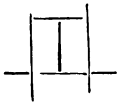
Continuation of 2nd Stage.

(NOTE.—Children are introduced in the following exercises to the meaning of the cipher. This ought never to be taught before the children have really come to *feel the use and convenience* of the symbols of arithmetic, and consequently care should be taken that their knowledge of mental arithmetic, as exemplified in the foregoing exercises in stick-laying, *be kept well in advance* of their acquaintance with the cipher.)

Material.—Sticks of one length, chequered slates, and pointed pencils; chequered blackboard and chalk.

Teacher. Lay one stick before you on the table, as a straight-up-and-down line. I will draw a picture of the stick on the blackboard.

Draw a picture of the stick on your slate; put the picture or mark you make into a little square; the square shall be like a little box into which we put the mark, thus—

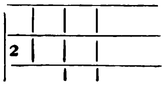


How many marks have you made for *one stick?*

Lay two sticks on the table as upright lines. Make a picture of them on the slate. How many marks have you made? Can you put any other kind of mark on the slate to make me think of the two things? (Two.)

Which is the quickest of these two ways?

I will show you another mark that makes everybody think of two things. Make this mark on your slates.



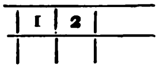
Which is the quickest of all these ways of making people think of two things?

Try the first way of writing two—try the second way—try the last way.

Lay three sticks on your slate. Now make a picture of these on the slate. How many marks have you made?

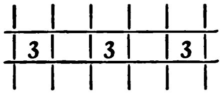
Can you not write *three* with two marks?

(This may be shown)—



How many *words* do I speak when I say "*three*"?

Now I will show you *one mark* which makes me think of *three*.



Make this on your slates. Make it three times, leaving one square empty between.

Now show me all the ways on your slates of making me think of "*three*."

Say all the numbers that make *three*.

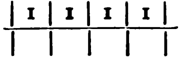
How many *words* did you say when saying three? (*Answer*. One word.)

Which is the quickest way of *saying* the number?

Which is the longest way?

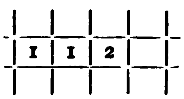
Which is the quickest way of *writing* the number? &c.

Teacher. Lay your sticks on the table. Make the picture of each of these in a little square of your slate. How many marks have you made for four sticks?

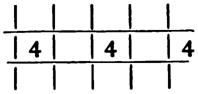


Can you make fewer marks and yet make me think of the number four?

How many marks have you made now?



Could you write the number four with fewer marks still? I will show you another way of writing the number four. How many marks have I made for four sticks?



Write this on to your slates three times in the row, leaving a square empty between each mark.

When you *wrote* the number four *in the longest way* how many marks did you make?

When you *wrote* the number *in the shortest way* how many marks did you make?

Say the number four in the longest way. (*Answer*. One, One, One, One.) How many *words* did you say to make me think of the number four?

Can you say that number with *fewer words* still?

How many *words* do you say when trying in the shortest way of all?

Now put away your slates and we shall try another way of learning these marks. I will give you a lesson *without speaking one word*. You shall answer all my questions *without speaking one word*, only hold up in your hands the number of sticks I ask for.

(The teacher then writes one or two figures already learnt on the blackboard; the class learns to interpret these *rapidly* with sticks laid out or held up. The children are at once amused and instructed by the habit of *strict silence* enforced during these exercises.)

Teacher.—Put away your sticks and

take up your slates. I will now take the sticks, and you must make the marks that mean the number of sticks I am thinking of. Make only *one* mark each time I lay down my sticks. Now make *two marks* for every number of sticks I show you. (The teacher looks at the slates.) Now make *three marks* for any number I am thinking of, &c.

(The figures are thus taught as far as nine, continuing mental problems connected with laying figures in sticks as far as twenty. When the children quickly associate the first nine figures with their respective quantities the abbreviations for

"added to"	+
"equal to"	=
"less"	—
"times"	×
"into"	:

are explained, and are first *laid with sticks*, then copied on to the slate as an exercise,* *e.g.* begin *with sticks*) :—

Sticks introductory to the Decimal System of Notation.

Materials.—Sticks and elastic bands for parcelling them.

Teacher. We have often made little heaps of our sticks; tell me some numbers we have had in our heaps?

Answer. We have had heaps of "twos," of "threes," of "sixes," &c.

Teacher. Open your bundle, and count the number of "ones" you have.

(*Answer.* There are ten "ones.")

Lay them in *one* heap. Here are some more sticks; come to my table and count out ten "ones;" now make *one* heap of them. Put your elastic bands round your ten sticks. Mary, come and do the same with mine. Come, Harry, and lay your bundle of ten sticks beside mine; how many tens of sticks have I now got?

(Four or five children lay their bundles in the same place in turn; the bundles of tens are counted.)

Teacher. You noticed how we all laid our bundles of tens in the *same place* on the table; we shall now have a place for the single sticks that will not make a bundle of ten. (A chalk ring is drawn round the bundles, another round the single sticks to the left.) Here I have sixteen loose sticks or "ones;" how many bundles of ten can we make out of them?

(A child steps in front of the class and parcels the ten; an elastic band is put over them.)

Teacher. Where shall we put this new ten of sticks?

How many sticks are over, that will not make a bundle of ten?

Where shall we put them? (The place is indicated.)

Teacher. Here are fourteen sticks; come and make as many bundles of ten as you can, Annie. How many bundles has she made?

Put the bundle in its place.

How many single sticks are there?

Put them in their place.

How many "ones" of sticks are there altogether?

Could you not make another bundle of ten?

Do so.

---

* In *large* classes the sticks may be laid by the children on a table in front of the class, when they have slates in their hands.

How many bundles of tens have we?

How many sticks are over?

We must try to have as many bundles of tens as we can; we must therefore watch the rings in which the single sticks are put, and whenever we have as many as will make a bundle we must clear them out.

ANOTHER LESSON.

Material.—As before; the teacher has bundles of ten sticks. The reverse process, that of decomposing tens into "ones" may now be illustrated.

Teacher. What have I got here?

Answer. A bundle of sticks.

Come out, Mary, and count how many one sticks are in that bundle.

(A child undoes the bundle and lays the sticks out. They are counted.)

Teacher. How many "ones" are there?

How many bundles did Mary undo?

(Another child undoes a second bundle, and the sticks are laid alongside of the last.)

Teacher. How many bundles have been undone?

How many "ones" of sticks have we got out of them?

Teacher. How many "ones" are there when we undo two bundles of ten?

Three bundles of ten?

Four bundles of ten? &c.

(These exercises are continued until the children can easily convert tens into ones; then both processes are tried one after the other; finally the sticks are removed, and the following questions are solved from memory.)

Teacher. I have eleven single sticks on the table; how many bundles of tens and how many "ones" shall I have?

I asked a child to make up twenty-one sticks into bundles of ten; how many bundles should he have?

How many sticks are there that won't make a bundle?

I have in my box seven bundles of ten and seven sticks; if I were to undo all those bundles, how many single sticks should I have? &c.

ANOTHER LESSON.

Notation on the blackboard in addition to the exercises in parcelling sticks.

Teacher. Do you remember how we made marks, or figures, on our slates, or on the blackboard, to tell people the number of sticks we were thinking of?

Well, we shall do that to-day. But just as we had *one place* for the bundles and *another place* for the single sticks on the table, we shall have *one place* for the figures that tell us about the number of single sticks, *another place* for the figures that tell us about the number of bundles. (Two columns are drawn.) Single sticks are laid one by one by the children on the table within the ring; the same child then writes the corresponding figure into the column of ones. When the ten ones are reached, the parcelling begins, and the new bundle is laid in the next ring. The teacher shows the column in which the number of bundles of ten is registered. For some little time the exercises in parcelling the sticks go hand in hand with the notation of tens and ones on the blackboard.

Ten bundles of tens may be parcelled in like manner, and placed in a third ring on the table, to the left of the other two. Exercises in converting hundreds into tens and ones are done with sticks, previous to and alongside of the notation and numeration of hundreds.

3RD STAGE.

(*Length* * is here the subject more especially.)

Material.—Every child is provided with nine sticks, say, of three lengths (1 inch, 3 inches, 4 inches), an equal number of each length. A chalk line may be drawn horizontally in front of the children on the table; this is a guide to the eye in laying the sticks out in rows. These exercises lead up to the 2nd stage of geometrical drawing, *to which* they gradually give place (page 160).

Teacher. Lay your sticks out in one long row of upright lines.

Are they all "as big as one another"?

Pick out one which you think is the shortest. Lay it by itself.

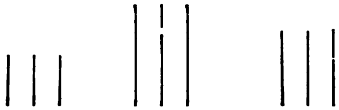
Pick out one which you think is the longest. Lay it by itself under the shortest stick.

Pick out one stick which you see is not very long and not very short. Lay it by itself underneath the last one.

Now lay those that are *as long as one another* in a row by themselves, beside each of the three sticks first laid down.

Teacher. Point to the first row. Point to the second row. Point to the third row.

How many sticks are as short as the shortest stick? How many short sticks are there?



Then we say those three sticks are all *one length.* Repeat this.

Teacher. How many sticks are as long as the longest stick? How many very long sticks are there? What shall we say about their length?

How many sticks are there that are not very long and not very short? What shall we say about their length?

How many *sticks* are there in the 1st row?

How many *lengths* are there in that row?

How many *sticks* are there in the 2nd row?

How many *lengths* are there in that row?

How many *sticks* are there in the 3rd row?

How many *lengths* are there in that row?

How many *sticks* have I given you to-day?

How many different *lengths* have I given you to-day?

Point to the sticks of the shortest length.

Point to the sticks of the middle length.

---

* The sticks ought to be cut to the English measure.

Point to the sticks of the longest length.

Take the *middle length* away. How many lengths are there amongst the remaining sticks?

Take the *longest length* away. How many *lengths* remain? Which is it?

Arrange the sticks differently. Put the shortest length in the 1st row and increase the length in each of the following rows.

Which length did we place in the 1st row?

Which length will be in the 3rd row?

Gather up the sticks into a loose heap once more.

Make the same number of rows as before with the same number of sticks in each row.

There must be *three different lengths* in the 1st row; there must be *three lengths* in the 2nd row; there must be *three lengths* in the 3rd row. (This is done in various ways.)

How many *lengths* are in the 2nd row?

How many *sticks* are in the 2nd row?

How many *lengths* are in the 3rd row?

Teacher. How many *sticks* are in the 3rd row?

How many *sticks* are in the 1st row?

How many *lengths* are in the 1st row?

Gather up your sticks into a loose heap. How many *sticks* are there in that heap?

How many *lengths* are in that loose heap?

Let us make a row of *three sticks; two lengths* only are to be in the row. Try to make other two rows with only *two lengths*, but with *three sticks* in each.

How many *sticks* are there in the 1st row? In the 2nd? In the 3rd?

How many *lengths* are in the 1st row? How many *sticks* are there of *one length* in the 1st row? How many *sticks* are there of the *other length* in the same row?

Gather your sticks into a heap once more. Lay the heap aside. I will give you another bundle of sticks which you must look at. (In a large class the teacher herself takes the bundle, and some child unties it in front of the class.)

Teacher. Tell me how many *sticks* are in this new bundle? (*Answer.* There are *nine* sticks.)

How many *lengths* are in this new bundle? (*Answer.* There is only *one length* in the bundle.)

Take the first bundle of sticks to hand.

How many things, with three sticks in each thing, could you make with nine sticks?

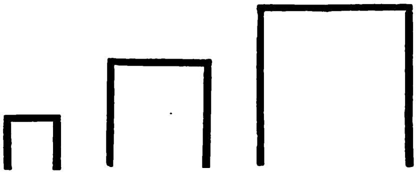
What should you like to make John?

Answer. "Tables!"

Answer. "Stools!"

Answer. "Beds!"

Teacher. Let us make the "tables" first. Use sticks of the *same length* in each figure.



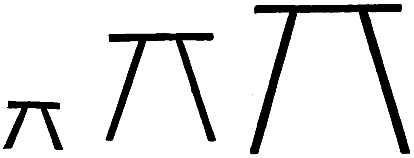
Are your "tables" all *as high as one another?*

Point to the *highest* "table."

What is the opposite of *highest* "table"?

Supposing we make "stools."

How many different heights are there?



Point to the *lowest* "stool."

Point to the *highest* "stool."

Point to the one of *middling height*, &c.

Another Lesson.—Continuation.

Material.—Twelve sticks of three lengths (1 inch, 2 inches, 3 inches), an equal number of each.

Teacher. Lay the sticks of one length by themselves in heaps. In which heap is the shortest length? In which heap is the longest length? In which heap is the middling length?

Now take one stick of the longest length, lay it by itself. Take one of the shortest length and lay it by the side of the longest stick, for we are going to measure them. Look how far up the short stick reaches by the side of the longest stick.

Could we put any more short sticks by the same side so as to touch the long stick? Let us lay as many short sticks as there is room for, end to end, by the side of the longest stick.

Teacher. How many short sticks will lie end to end by the side of the longest stick, to make one quite as long? When we require three of those short sticks to make *one long stick* we call each of the three pieces *one-third* of a long stick. (Repeat.)

Take away one-third of the longest stick.

Take away another third; take away another, and another.

Answer. We cannot!

Teacher. How many pieces called "thirds" can you take away? How many "thirds" will make *one* of the *longest sticks?*

Teacher. Put away the *longest* stick and take one of *middling length.* Now lay short sticks end to end by the side of it. How many *short* sticks make *one* stick of *middling length?*

You tell me there is only room for *two short* sticks lying end to end by the side of this stick. When *two short sticks* make *one* stick of that length, we say: A short stick is the *half* of the stick of middling length. (Repeat.)

Now take away one-half of the stick that length. Take away the other half. How many *halves* make *one stick?* Now put your sticks into a heap once more. (The teacher produces a foot rule.)

Teacher. Here I have got a longer stick than any of you. What do you see upon it?

Answer. Marks! Lines! Numbers!

Teacher. Very well. Let us lay one of your shortest sticks upon my long stick; we will see how far up it reaches upon my long stick. (A child does this and reports that the short stick reaches as far as a mark and the figure 1.)

Teacher. That is right. Now anything that reaches as far up as that figure 1 is said to be *one inch long.*

Teacher. How long must your shortest stick be?

Answer. The shortest stick is *one inch* long?

Teacher. Take one of the next longest sticks and lay the short sticks end to end by the side of it. How many short sticks can you put there? How many inches long must the next longest stick be? (This is afterwards verified with the foot rule.)

Teacher. Take one of the longest sticks and lay short sticks, end to end, by the side of it. How many short sticks can you place by the side of the longest stick? How many *inches* long must the longest stick you have be?

Teacher. How *much longer* is the longest stick than the shortest stick you have?

How much longer is the stick of middling length than the shortest stick you have?

Lay one of the shortest, one of the longest sticks, and one of middling length end to end in a line.

How *many inches long* is that line?

Lay a horizontal line with sticks, end to end, 4 inches long; lay one 9 inches, 12 inches long, &c.

Lay a line of sticks that will stretch across the top of your slate. How many inches across does your slate measure? Do the same across the end of the desk. Tell me how many inches it is across, &c.

(NOTE.—Exercises like the above might be continued, increasing the number of different lengths until five lengths are given, when the teacher is referred to the Geometrical Drawing Exercises of the 2nd stage (page 160) for further illustration of the use of the stick-laying exercises.)

DRAWING.

As soon as a child can hold a pencil in his hand, he is interested in trying to draw trees and houses, and anything else he sees; these productions, however imperfect to us, are a great source of enjoyment to the child himself. *Alongside of* such impromptu attempts, we may give him instruction of a more systematic kind, and gradually perfect his skill in manipulating with the pencil without discouraging his own efforts.

To guide the unpractised hand, to give the first ideas of length and proportion, Fröbel suggested that drawings should be executed upon a chequered surface. These lines, crossing at right angles, form squares all over the paper or slate. The exercises drawn into such a network of lines would, from their nature, belong chiefly to Groups C and B. Other exercises, such as the imitation of natural forms, leaves, animals, &c., are best drawn upon the smooth surface without lines, and according to our arrangement these come under Group A (see page 158).

In a drawing lesson two groups might be represented thus, *e.g.*

1st Lesson { Group C, 1st Exercise.
" { Group A, Object.

2nd Lesson { Group C, 1st Exercise.
" { Group B, Pattern.
3rd Lesson { Group C, 2nd Exercise.
" { Group A, Object, &c.

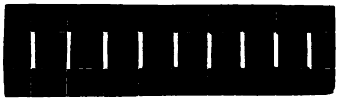
Let us consider the three groups in detail.

GROUP C.—GEOMETRICAL DRAWING EXERCISES.

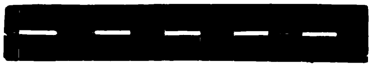
THE exercises in the first stage are of a very simple character, dealing with the *length* and *direction* of straight lines.

FIRST STAGE.

Ex. 1.



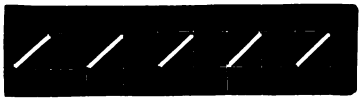
Ex. 2.



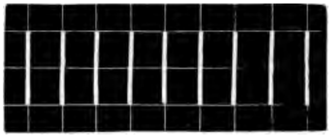
Ex. 1. "Upright" lines by the side of (afterwards in the middle of) one square. (Comparison, see lesson on 1st exercise, page 159.)

Ex. 2. "Even-along" lines, on to the top of one square. Compare this to a "little pencil," or a "little fish swimming," or anything else the children may suggest.

Ex. 3.



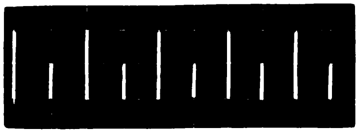
Ex. 4.



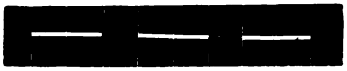
Ex. 3. Slanting lines through one square. Compare to "children running after one another," &c.

Ex. 4. "Upright" lines, by the side of two squares (afterwards through the middle of two squares). Comparison.

Ex. 5.



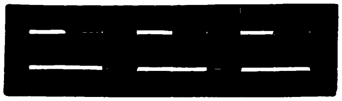
Ex. 6.



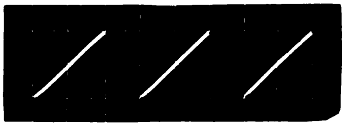
Ex. 5. "Upright" lines as long as one and two squares. Compare to "the tall sister taking care of the little sister," &c.

Ex. 6. "Even-along" lines as long as two squares. Comparison.

Ex. 7.



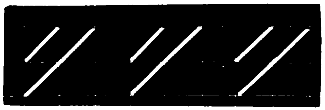
Ex. 8.



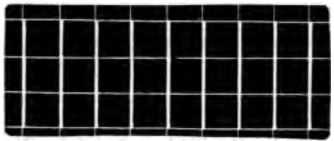
Ex. 7. "Even-along" lines, as long as one and two squares. The longest below, the shortest above. Comparison.

Ex. 8. Slanting lines through two squares. Comparison.

Ex. 9.

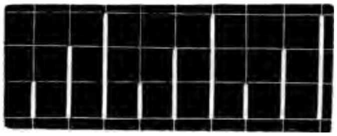


Ex. 10.

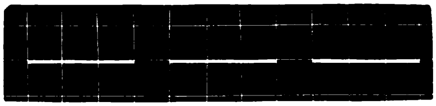


Ex. 9. Slanting lines through two squares, and one square. Comparison.
Ex. 10. "Upright" lines as long as three squares. Comparison.

Ex. 11.

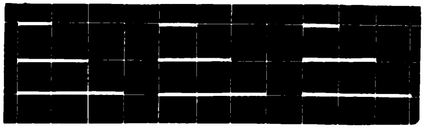


Ex. 12.

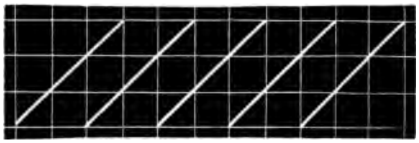


Ex. 11. "Upright" lines in a row, as long as one, two, and three squares. Comparison.
Ex. 12. "Even-along" lines as long as three squares. Comparison.

Ex. 13.



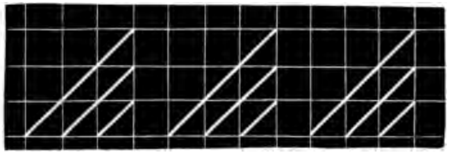
Ex. 14.



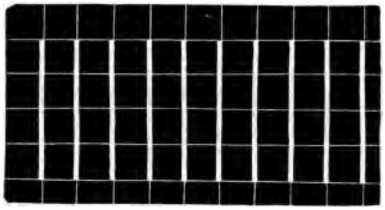
Ex. 13. "Even-along" lines as long as one, two, and three squares, lines are placed over one another, the shortest at the top. Compare with "steps."

Ex. 14. Slanting lines through three squares. Comparison.

Ex. 15.



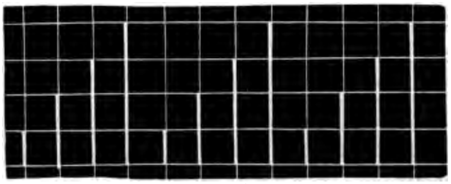
Ex. 16.



Ex. 15. Slanting lines through one, two, and three squares, the lines are placed under one another, the shortest at the bottom.

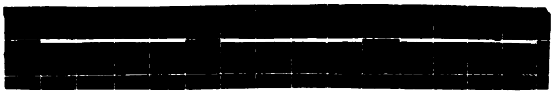
Ex. 16. "Upright" lines as long as four squares. Comparison.

Ex. 17.



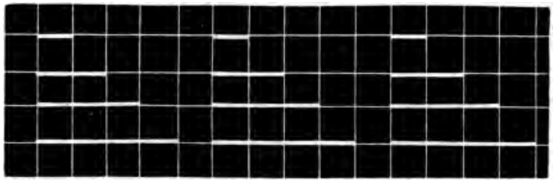
Ex. 17. "Upright" lines of different lengths in a row, increasing in height; first is as long as one square, then one as long as two, three, and four squares. Compare to "family of lines, father, mother, sister, and baby line," &c.

Ex. 18.



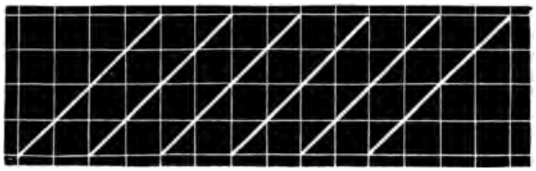
Ex. 18. "Even-along" lines as long as four squares. Comparison.

Ex. 19.



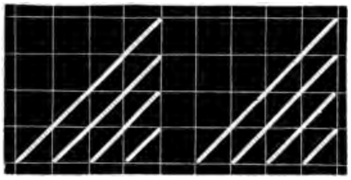
Ex. 19. "Even-along" lines of one, two, three, and four squares, placed over one another, getting shorter as they ascend. Compare to "steps," &c.

Ex. 20.

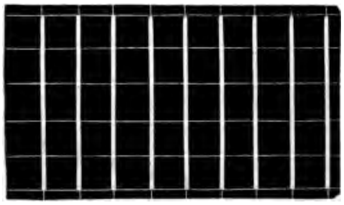


Ex. 20. Slanting lines through four squares.

Ex. 21.

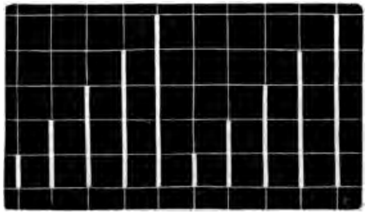


Ex. 22.

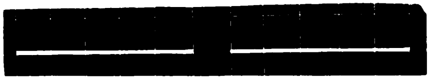


Ex. 21. Slanting lines of four (known) lengths. Comparison to "little neckerchief," &c.
Ex. 22. "Upright" lines by the side of (afterwards in the middle of) five checks. Comparison.

Ex. 23.

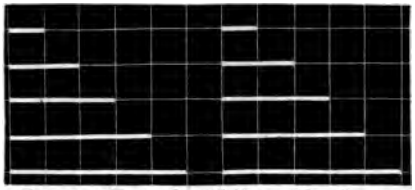


Ex. 24.



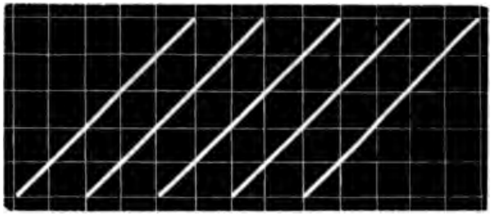
Ex. 23. "Upright" lines of five (known) lengths, placed in a row, according to length. Comparison.
Ex. 24. "Even-along" lines as long as five squares.

Ex. 25.



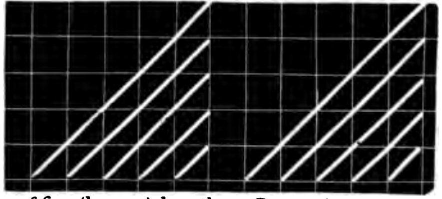
Ex. 25. "Even-along" lines of five (known) lengths, placed over one another, according to length. Comparison.

Ex. 26.



Ex. 26. Slanting lines through five squares. Comparison.

Ex. 27.



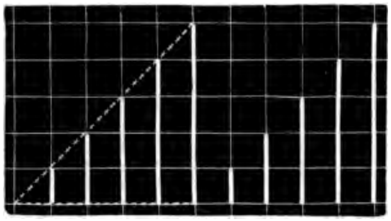
Ex. 27. Slanting lines of five (known) lengths. Comparison.

SECOND STAGE.

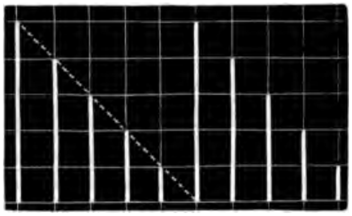
In the second stage the lines already familiar to children, as such, are grouped together to form a certain figure.

The lines previously practised separately are now grouped to form—

Ex. 1.

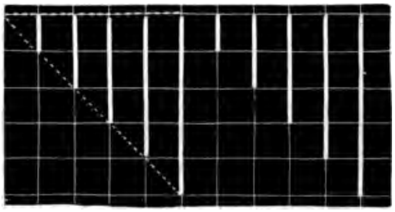


Ex. 2.

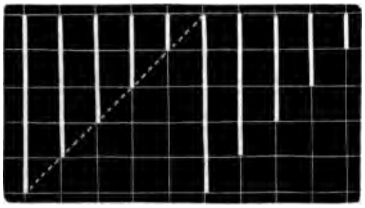


Ex. 1. The right-angled triangle (with perpendicular lines), right angle lies below and to the right of the figure.
Ex. 2. Ditto (ditto), the right angle lies below and to the left of the figure.

Ex. 3.

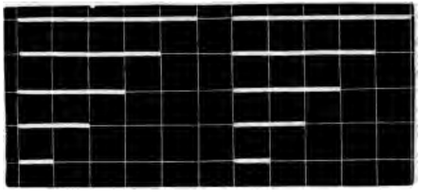


Ex. 4.

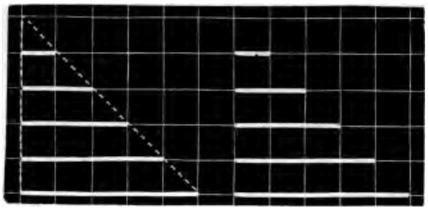


Ex. 3. Ditto (ditto), the right angle lies above and to the right of the figure.
Ex. 4. Ditto (ditto), the right angle lies above and to the left of the figure.

Ex. 5.

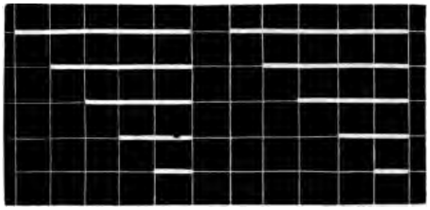


Ex. 6.

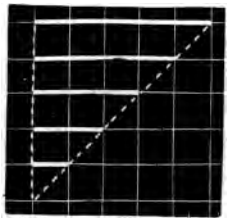


Ex. 5. Ditto (with horizontal lines), the right angle lies below and to the right of the figure.
Ex. 6. Ditto (ditto), the right angle lies below and to the left of the figure.

Ex. 7.

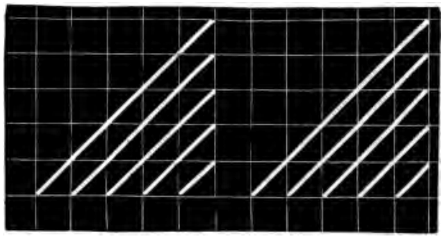


Ex. 8.

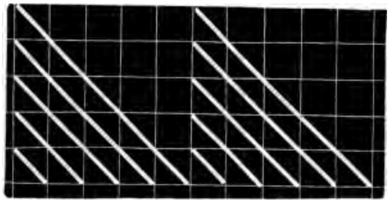


Ex. 7. Ditto (ditto), the right angle lies above and to the right of the figure.
Ex. 8. Ditto (ditto), the right angle lies above and to the left of the figure.

Ex. 9.

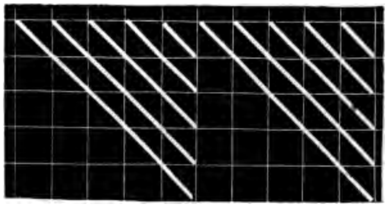


Ex. 10.

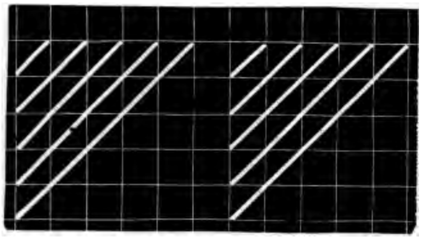


Ex. 9. Ditto (with oblique lines), the right angle lies below and to the right of the figure.
Ex. 10. Ditto (ditto), the right angle lies below and to the left of the figure.

Ex. 11.

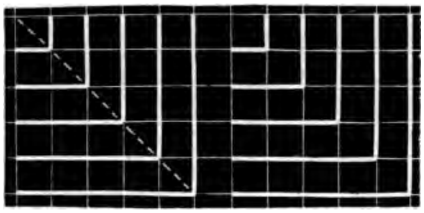


Ex. 12.

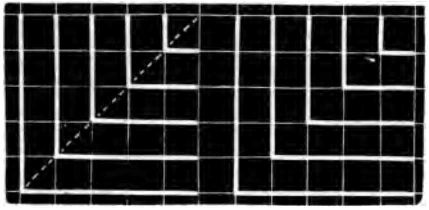


Ex. 11. Ditto (ditto), the right angle lies above and to the right of the figure.
Ex. 12. Ditto (ditto), the right angle lies above and to the left of the figure.

Ex. 13.



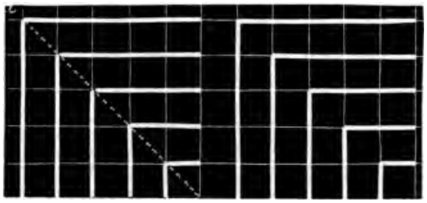
Ex. 14.



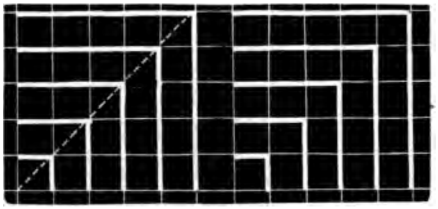
Ex. 13. Exercises 3 and 6 joined to indicate a square in *outline;* at the place of joining a *right angle* is formed.

Ex. 14. Join Exercises 4 and 5; right angle lies below and to the left of the figure.

Fx. 15.



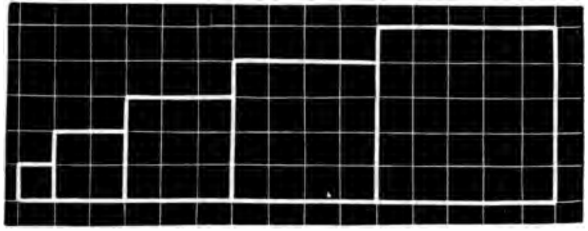
Ex. 16.



Ex. 15. Join Exercises 2 and 7; right angle formed above and to the left of the figure.

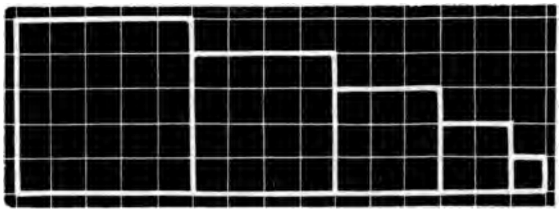
Ex. 16. Join Exercises 8 and 1; right angle formed to the above and to the right of the figure.

Ex. 17.



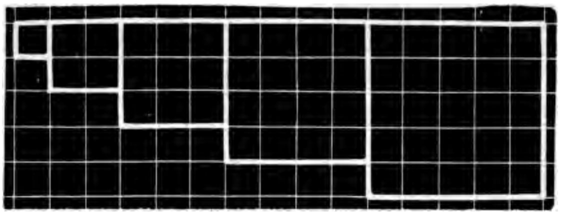
Ex. 17. Five squares standing alongside of one another, beginning with the smallest square; the squares increase in size from left to right. A long horizontal line below. Compare to "steps."

Ex. 18.



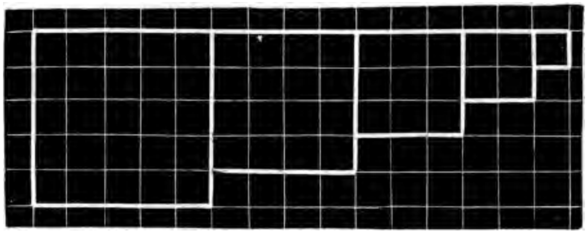
Ex. 18. Ditto, beginning with the largest square. Comparison.

Ex. 19.



Ex. 19. With squares of five sizes in a row suspended ("hanging") in order of their size, beginning with the smallest.

Ex. 20.

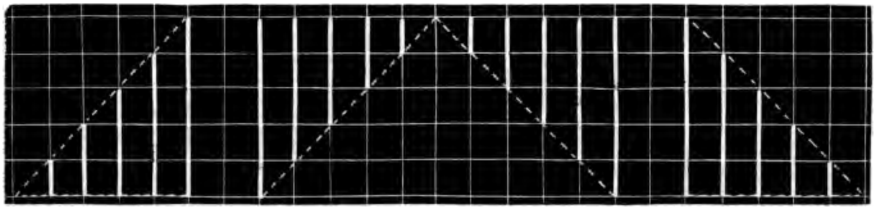


Ex. 20. Ditto, hanging according to their size, beginning with the opposite size.

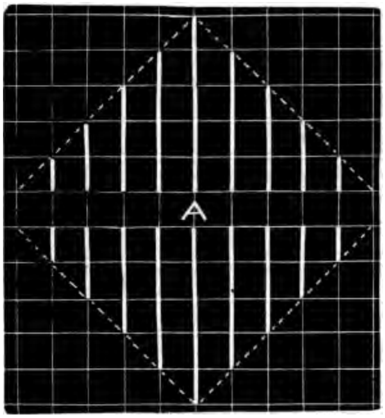
THIRD STAGE.

In the third stage the right-angled triangles are combined to form various larger figures, and these exercises are often sufficiently difficult for older students.

(Note.—Try the problems *first* with 4 triangular pieces of cardboard, then draw them.)



The first four elements of Fröbel's course of Geometry for children are here given. These right-angled triangles having been previously practised in the 2nd stage, the children may now proceed to combine them in a single figure. The figure must be made from description (see page 166).



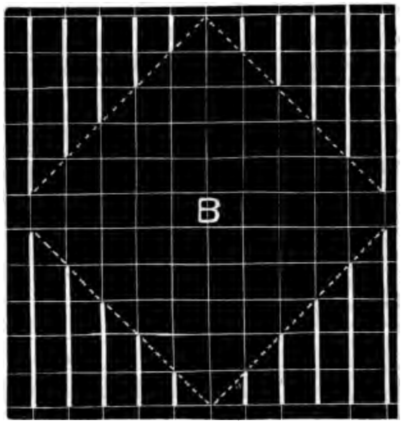
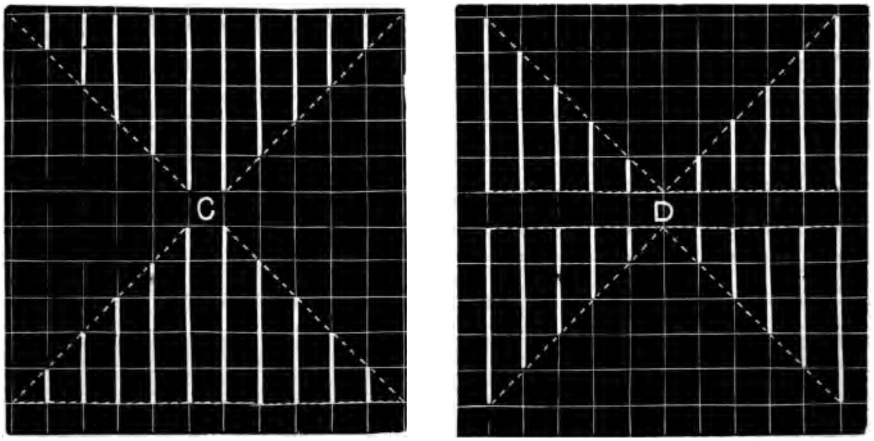


FIG. A. This is a star-form made by arranging the four triangles, so as to have four right angles in the centre; the legs of these right angles are within the figure, the centre of which is filled.

FIG. B. The opposite of the last. The four right angles and the eight legs of the right angles lie on the circumference of the figure; the centre is blank.



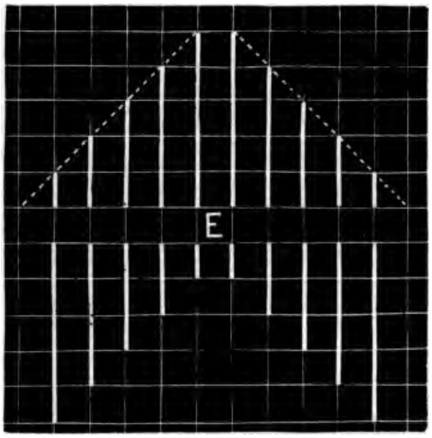
FIGS. C AND D. These partake of the nature of A and B in equal proportions, therefore they are called *intermediate forms.*

In C four legs of the right angles lie within the figure, four lie on the circumference; each right angle lies half inside half outside; the four legs of the angles within the figure are perpendicular lines.

In D the four legs of the angles within the figure are horizontal; those on the circumference are perpendicular.

The first figures pleased the eye by their regularity and symmetry; the centre to which their several parts referred was visible at a glance; they impressed us with a sense of their *com-*

pleteness. Figs. C and D did this in a less degree, still two sides corresponded although two were left blank. Lastly we must find other intermediate figures between A and B, partaking more of the one than the other extreme, and so irregular in outline as to suggest additions being made to restore their symmetry. There are four figures such as are here described and we shall call them capital E, F, G, and H respectively. Let us try to find them from the following description.



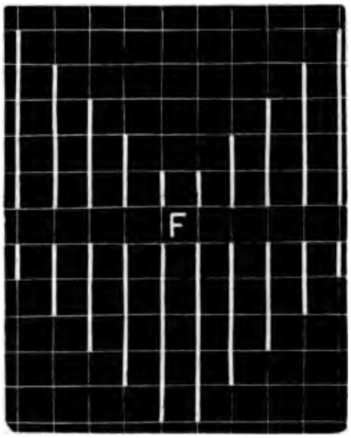
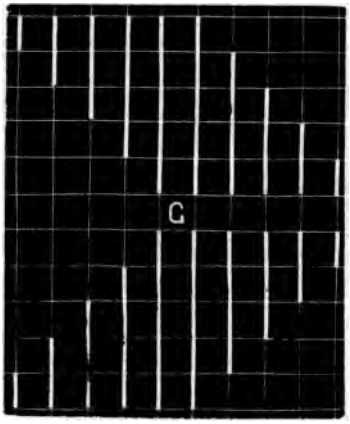


FIG. E. Here two right angles lie completely within the figure, the other two lie half within, half on the circumference. This distribution determines the place of the 8 legs of these angles; ¾ of their number (4 horizontal and 2 perpendicular lines) lie within, ¼ of their number (2 perpendicular lines) lie on the circumference of the figure E.

FIG. F. The same description as for E, only the position of the figure is reversed.



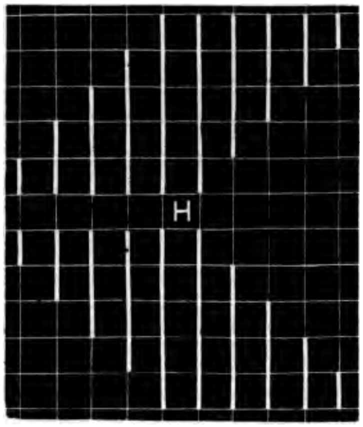
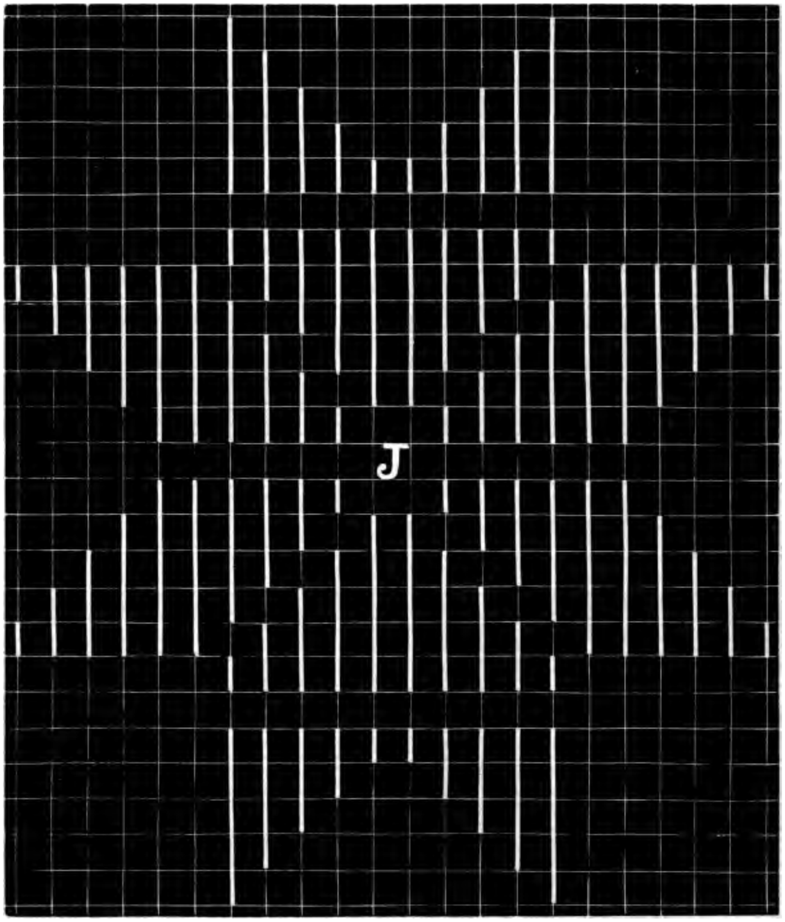
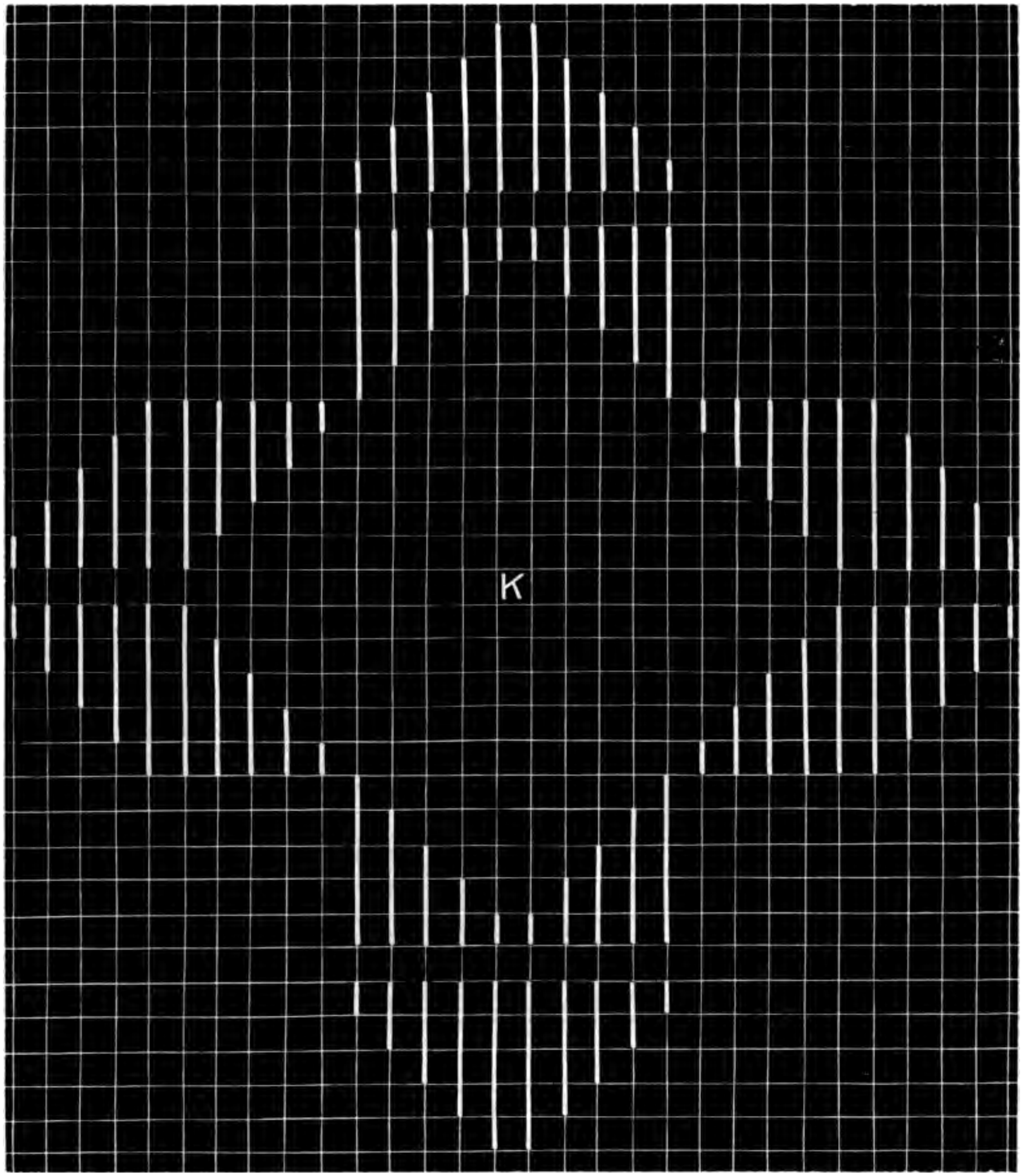


FIG. G. Here 4 (perpendicular) and 2 (horizontal) legs are within, only 2 horizontal legs are on the circumference of the figure.

FIG. H. The same description as for G, the position of G is reversed.

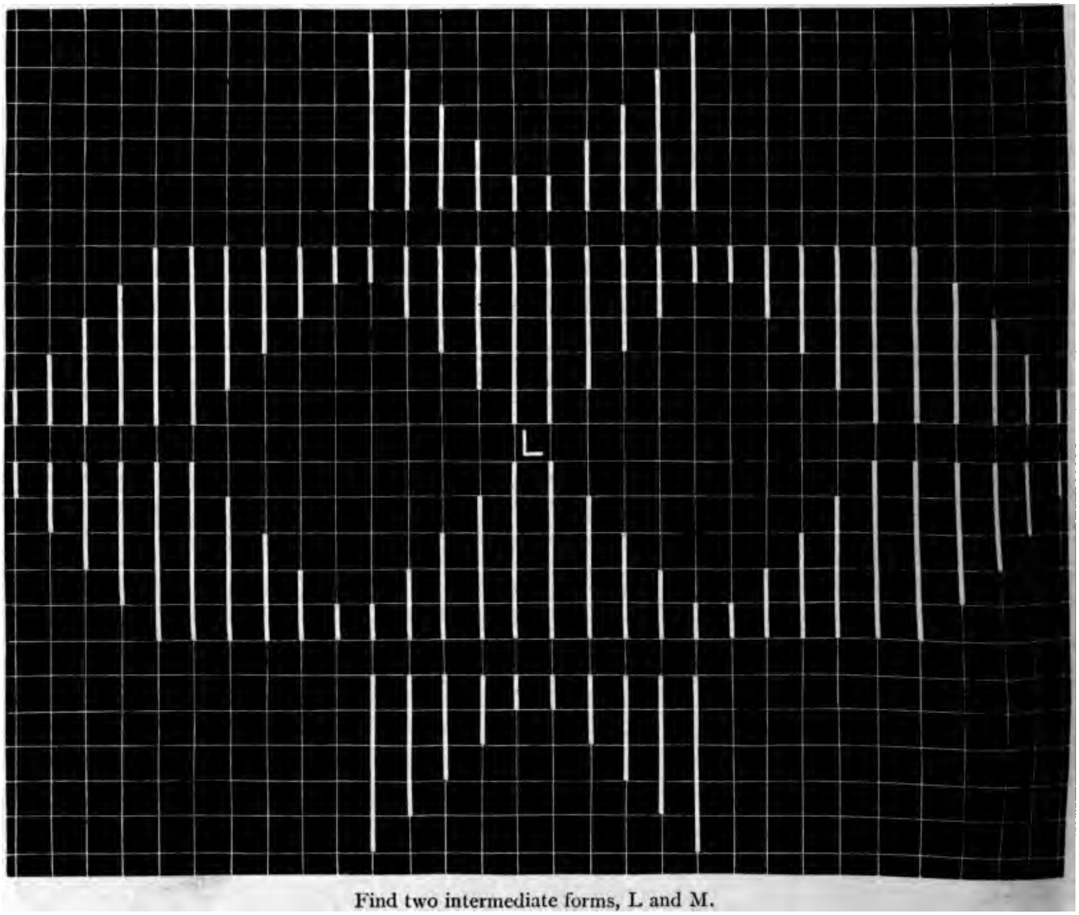


The last four figures are combined to form figure J with filled centre.

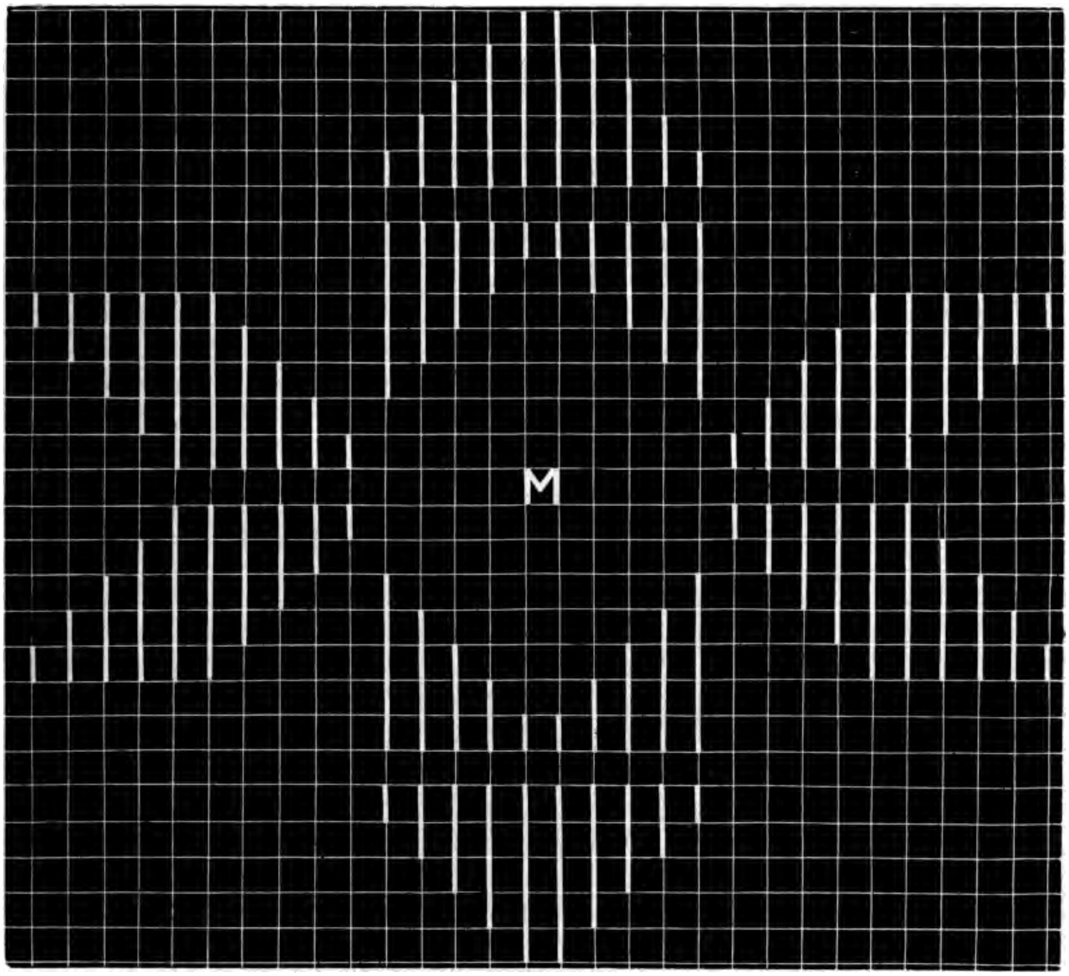


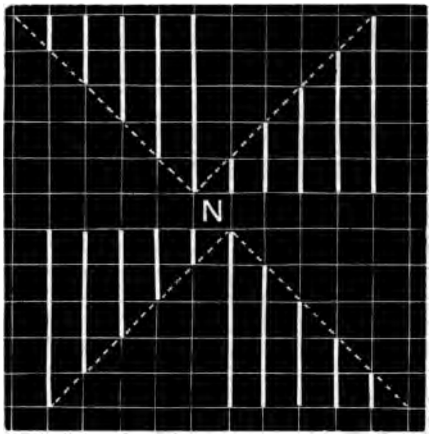
Find a figure K with blank centre the reverse of J.

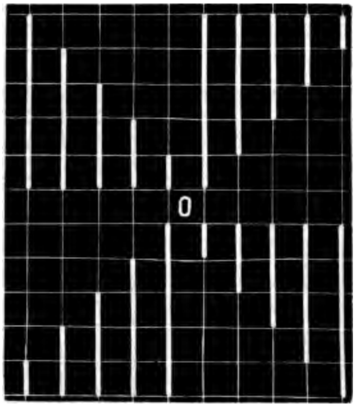
K 2



Find two intermediate forms, L and M.


M

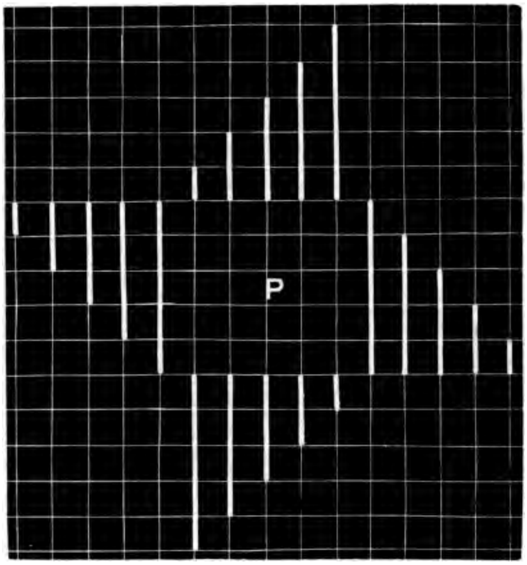




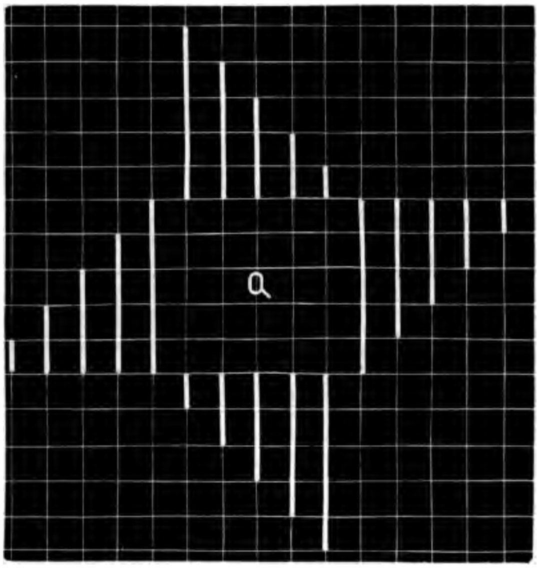
Some figures by their outline suggest *rotary motion.*

In N the movement is from right to left, all the triangles will be so arranged as to have 4 acute angles meeting in the centre, the angles on the circumference will follow in the following order :—acute—right—acute—right—acute—right—acute—right.

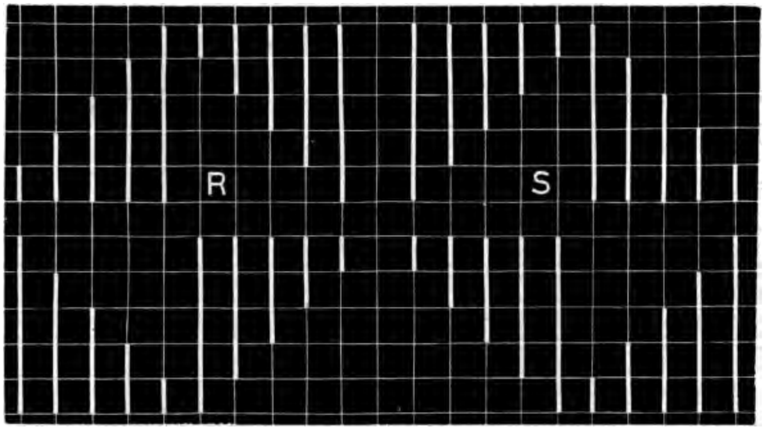
In O the movement is from left to right; triangles arranged as in N.



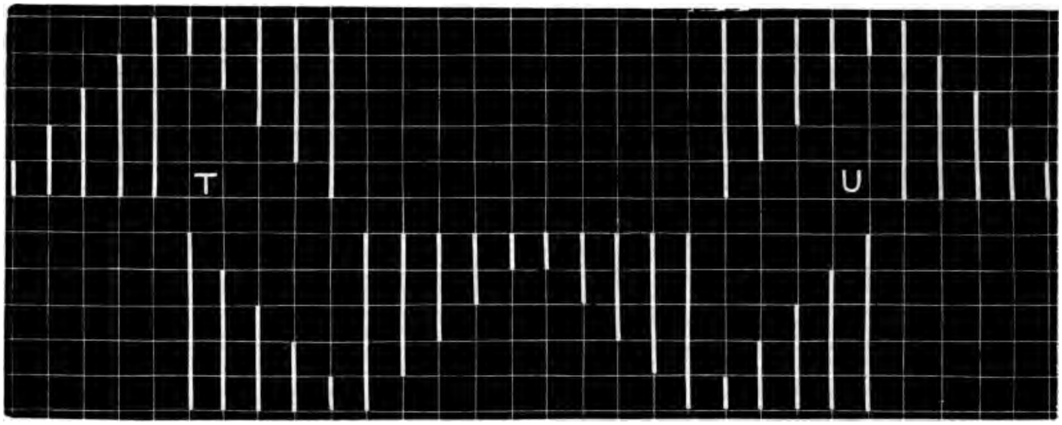
FIGS. P AND Q indicate *slow* motion; in P from right to left, in Q from left to right, the triangles must be so placed in either figure as to have a right and an acute angle meeting 4 times round the centre; four acute angles lie on the circumference.



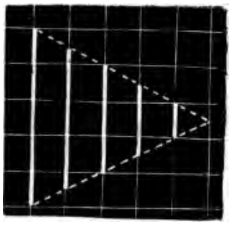
It remains for us to find intermediates between figures N and O, which represent movement from right to left and from left to right respectively. The new figure R turns both to the right and to the left; the double movement may be seen in one and the same figure. The triangles are so arranged as to have all their acute angles meeting; two right angles lie near the centre, two right angles lie on the circumference of the figure.

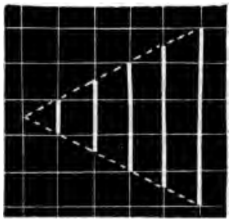


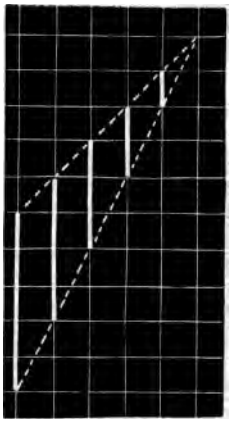
S is the opposite in motion.



FIGS. T AND U are intermediate between P and Q. In T and U the angles follow in this order:—2 acute—1 right—1 acute and 1 right—2 acute—1 right—1 acute and 1 right; thus T and U are intermediates also between P, Q, and R, S; for in P and Q an acute and a right angle meet twice; in R and S two acute angles meet twice; in T and U all these angles meet twice.

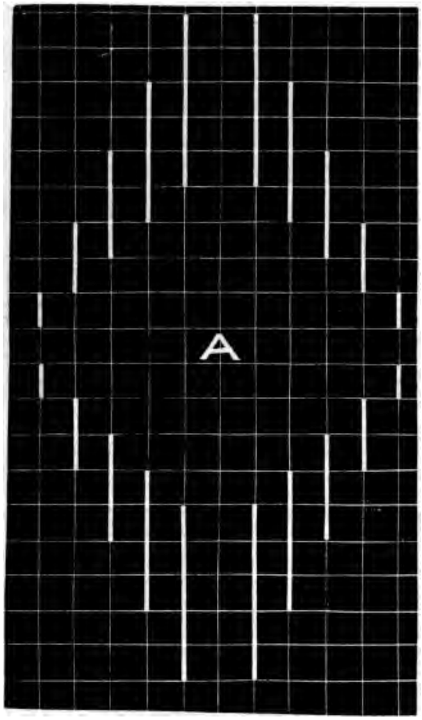


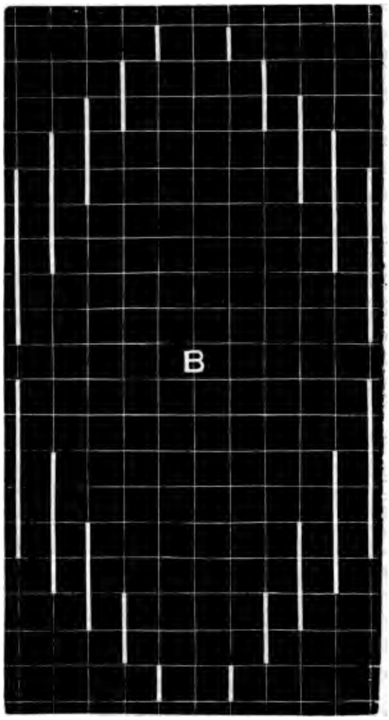




We try to form the acute-angled equilateral triangle by grouping the five perpendicular lines. We find we can only do so in two positions, consequently no combinations can be made with these two elements alone.

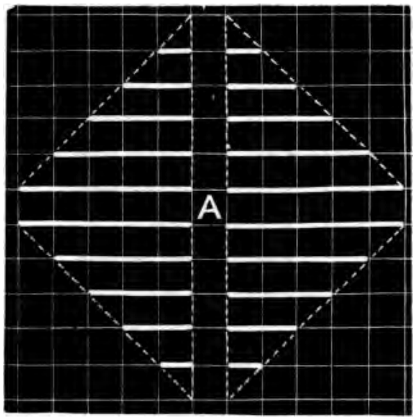
We try to form the obtuse-angled triangle, and we find four of these. Try the usual combinations.



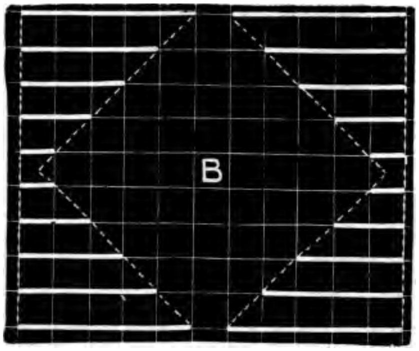


Elements formed by grouping Horizontal Lines.

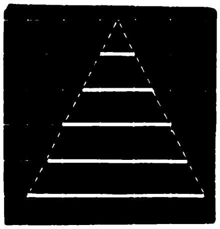
We pass on to use horizontal lines of 5 different lengths, and having obtained the right-angled triangle in 4 positions we proceed to make the usual combinations.

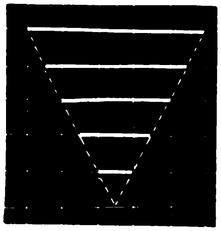


A. (See former explanation with perpendicular lines).



B. The opposite of A, &c., see combinations above.





Having come to the point in series where the equilateral triangle appears, we must remember that we could only form two of these (see page 136) by grouping perpendicular lines. By grouping the horizontal lines of five lengths we obtain two other triangles pointing upwards and downwards, and with these four elements we proceed to make the usual combinations A, B, &c., remembering that the position of the 3rd acute angle is our chief consideration.

NOTE.—These combinations having once been given and the rule having been explained, it is thought unnecessary to illustrate them by means of diagrams each time new elements are used.

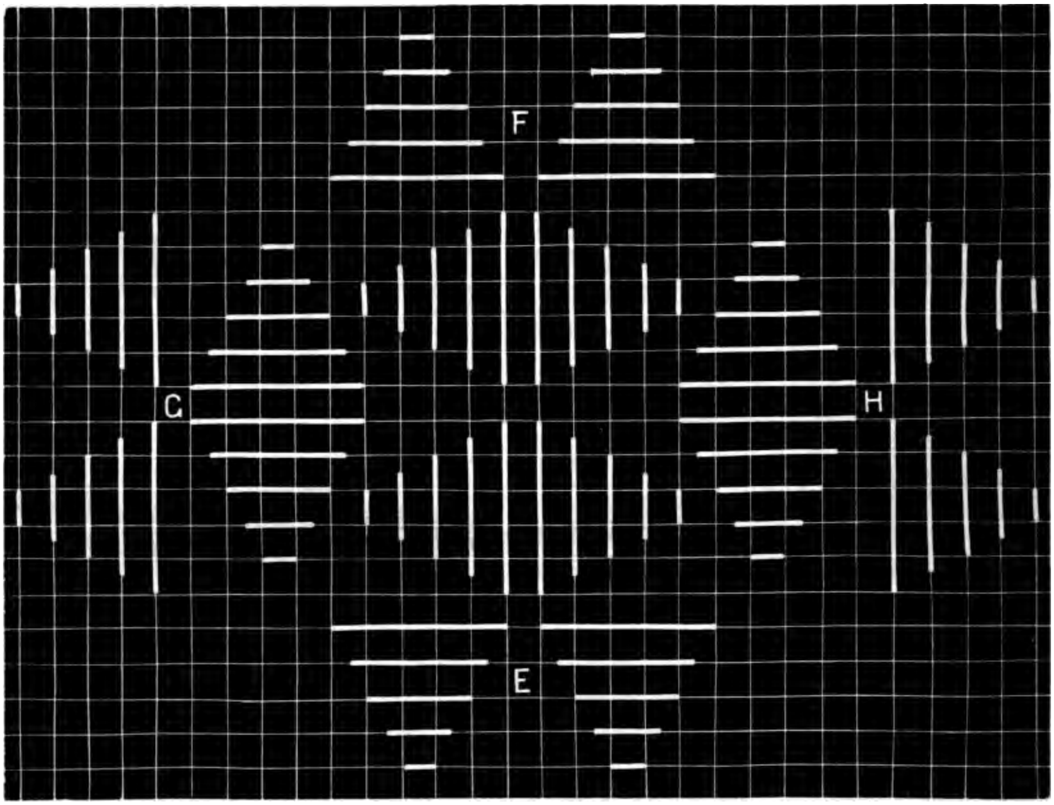
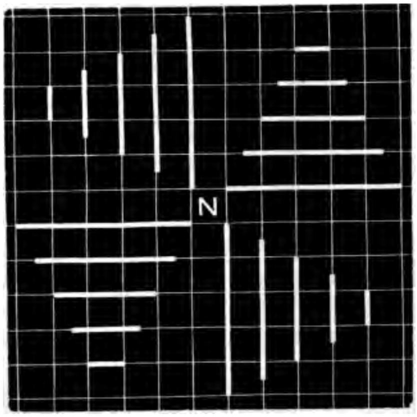
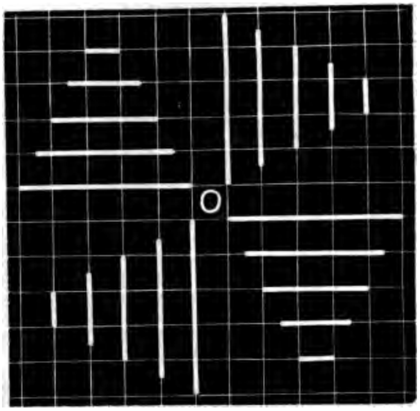


Figure (I) is made up of E, F, G, and H, the elements of which are *acute-angled triangles*. This star form corresponds to the same letter (I) amongst the exercises on the *right angles* and *obtuse angles*. I has a filled centre.

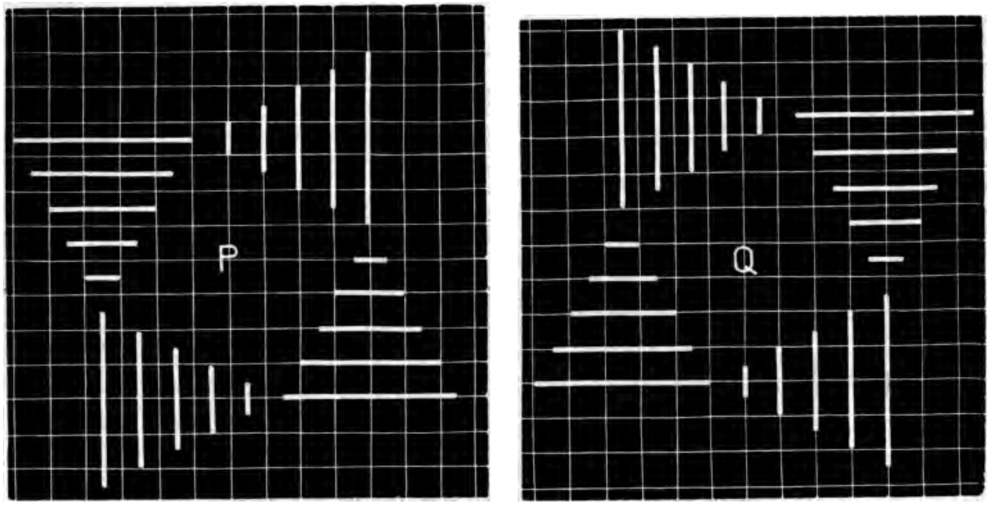
The following forms are suggestive of rotary movement :—



N motion from right to left.



O ditto, from left to right.



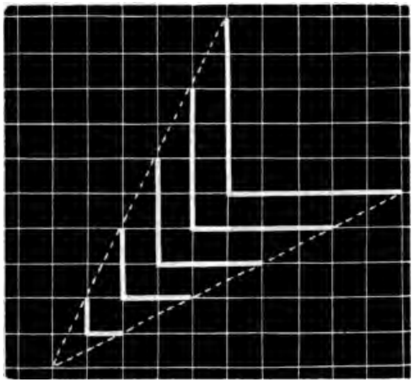
P and Q suggest the idea of *slow* rotation.

Elements formed by grouping Horizontal and Perpendicular Lines meeting in an Angle.

Our new element combines both horizontal and perpendicular lines meeting to form a right angle. In order to find the above new element we have simply to join two right-angled triangles together, one formed by grouping horizontal lines, another formed with perpendicular lines. (See 2nd Stage, Ex. 13, 14, 15, 16, page 126.)

The outline of our new figures *indicates* the square. Try one or two of the usual combinations A, B, &c.

By combining perpendicular and horizontal lines we *cannot* obtain any figure with an obtuse angle, and the following four elements (*a*, *b*, *c*, *d*) can only be described as having an acute angle as chief angle (in outline), also a right angle as an interior angle.



Try the usual combinations with these elements A, B, &c.

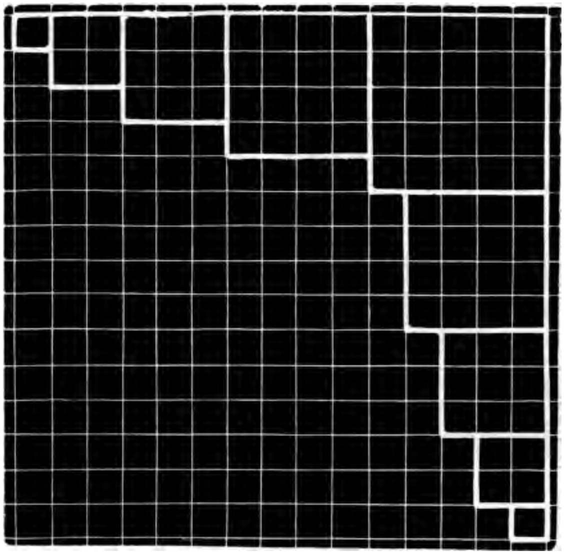
We formerly combined vertical and horizontal lines of the *same* length, meeting at right angles; these figures indicated the square in outline.

Now by joining vertical and horizontal lines of *different* lengths at a right angle, we obtain elements oblong in outline.

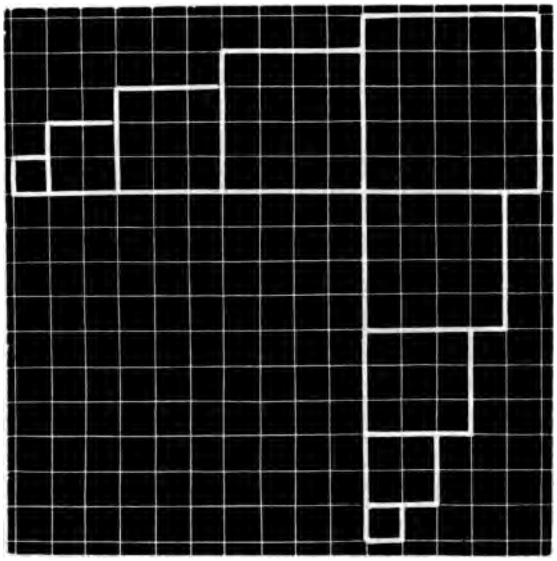
Find four such elements for further combinations.

Elements formed by grouping Squares.

Four new elements may be obtained by drawing the five sizes of squares (see 2nd Stage, Ex. 17) alongside of and over one another, *in one and the same figure;* this is done in such a way as to have nine squares in all (each size is repeated with the exception of the largest), and the outline of the figure on the one side forms a right angle with legs produced to a considerable length. Find four such elements and try a few combinations with them in the usual way.



Four new elements are obtained by arranging the squares so as to make the right angle before alluded to an interior one; the figure will now have a somewhat broken outline although presenting the same general appearance.

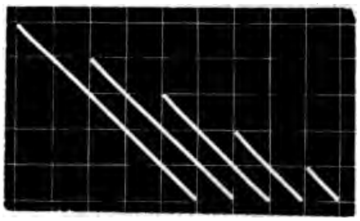


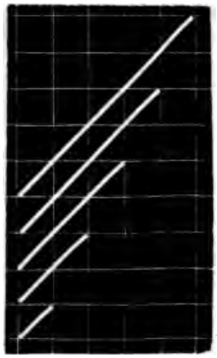
Make a few combinations with the above.

(NOTE.—The exercises previously executed with squares of various sizes may be repeated with oblongs at the student's leisure.)

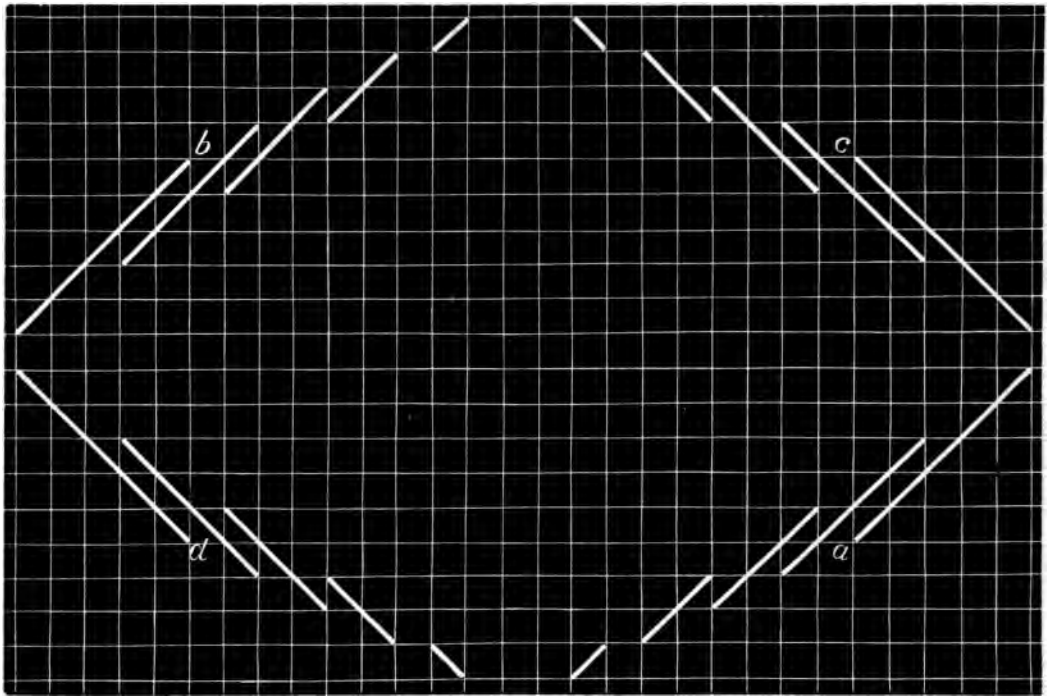
Elements formed by grouping Oblique Lines.

We group the oblique lines to indicate the triangle with an obtuse angle in outline.

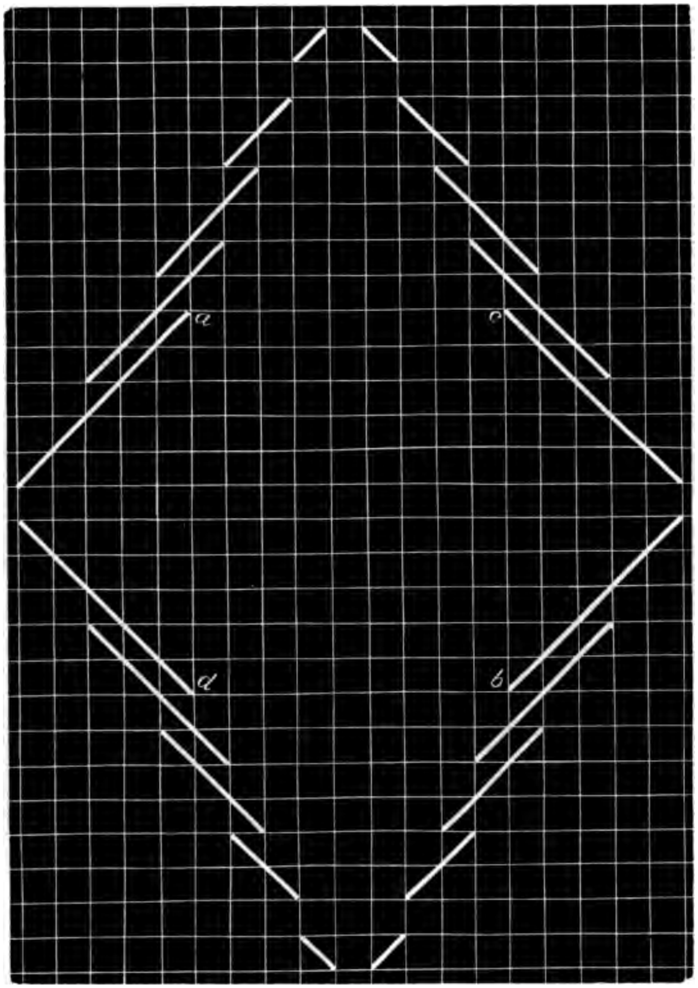




In this Example the obtuse angle is contained by a horizontal and an oblique line.
In Example 2 the obtuse angle is contained by a perpendicular and an oblique line.

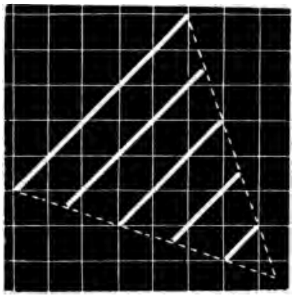


In this Example the obtuse angle is contained by two oblique lines which incline to the horizontal.



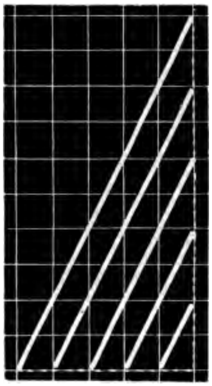
Here in this Example the oblique lines containing the obtuse angle incline more to the perpendicular.

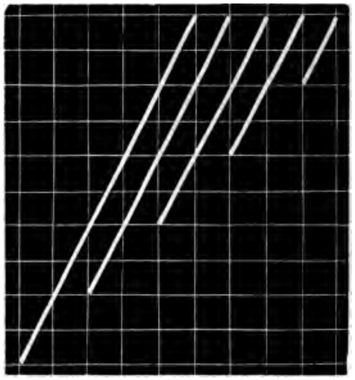
The oblique lines are here grouped to indicate an acute-angled triangle in outline; the position of the acute angle would be considered in making the usual combinations.



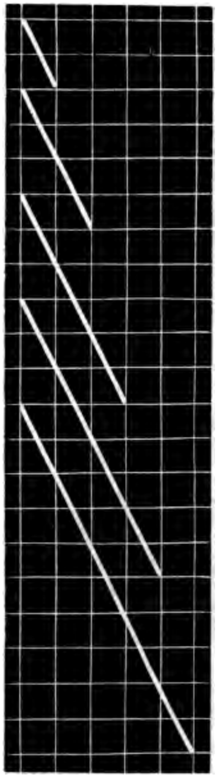
Elements formed with Oblique Lines inclining to the Perpendicular or to the Horizontal Line.

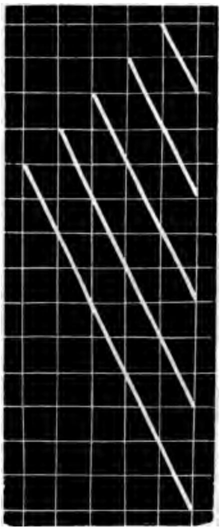
The oblique lines hitherto used have been the diagonal of a square; we shall now use oblique lines of five different lengths, inclining towards the perpendicular. The degree of their inclination will be as 2 to 1, or in other words, for every square they occupy in a horizontal direction these lines will occupy double that number of squares in perpendicular direction. These lines, when found, are grouped to make a triangle with *a right angle*, having three unequal sides.





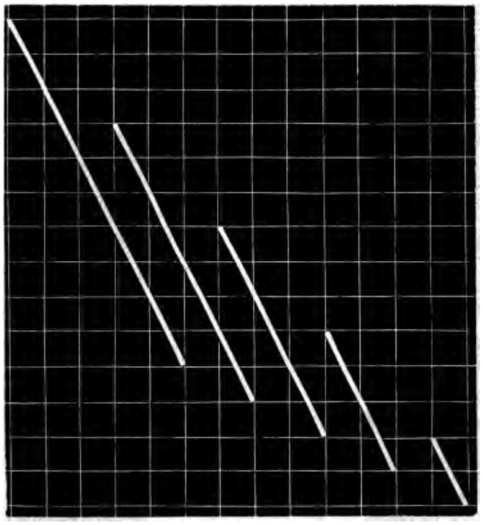
The same lines otherwise grouped form a triangle with *an obtuse angle*. In this figure the lines containing the obtuse angle are oblique and horizontal.



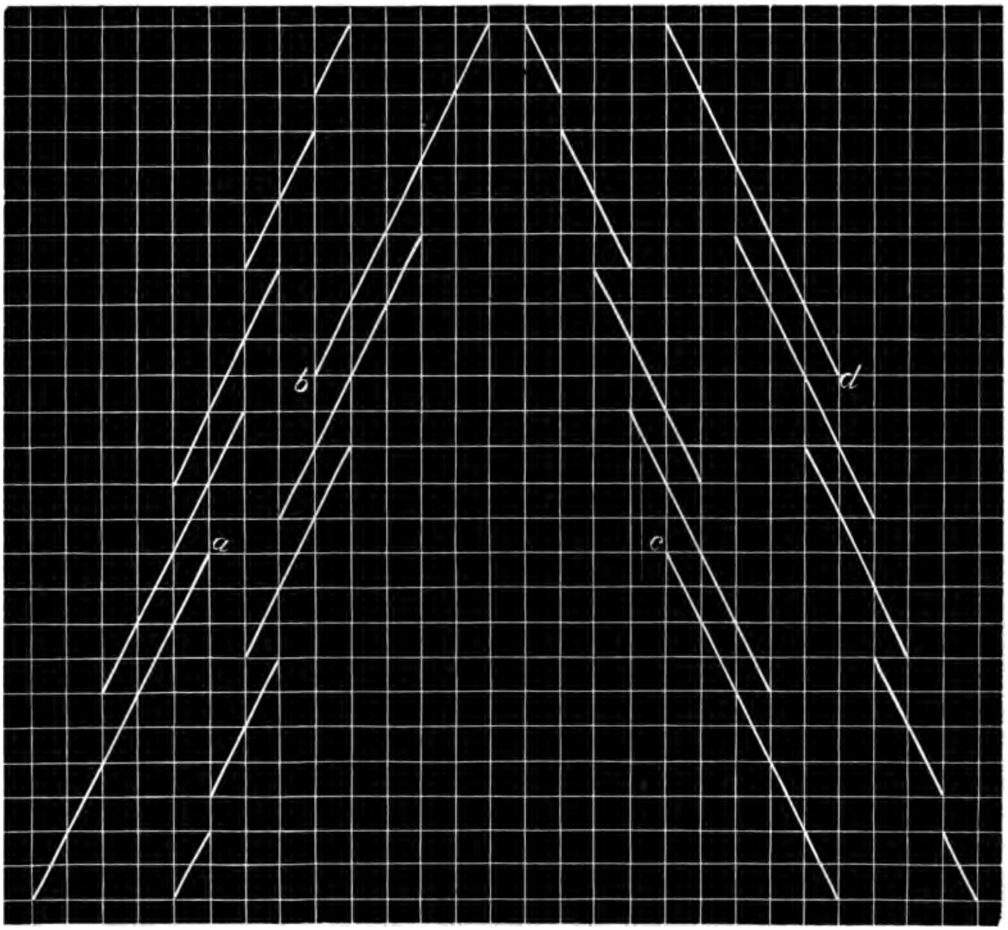


In this figure the lines containing the obtuse angle are oblique and perpendicular.

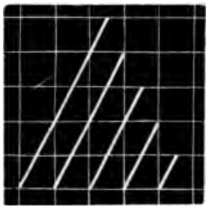
In this example the obtuse angle is contained by two oblique lines, whilst the line opposite to the obtuse angle is perpendicular.



In this example the obtuse angle is contained by two oblique lines, whilst the line opposite is likewise oblique.



Another of the above.



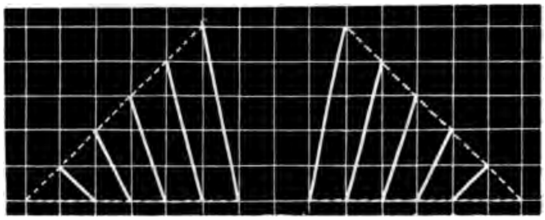
The same lines may be grouped to indicate triangles in outline with an acute angle.

Oblique lines *inclining towards the horizontal line* are now grouped; the degree of their inclination is as 2 to 1. We obtain four such elements as the scalene and we try some of the usual combinations.

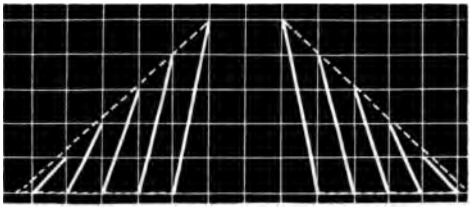
(NOTE.—Obtuse and acute-angled triangles may be found by grouping the above lines.)

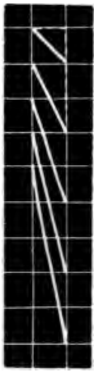
Elements formed by grouping Lines of different degrees of Obliquity.

Five lines (each of which has a *different* degree of obliquity) are grouped in the same figure. The inclination of each of the five lines would be as 1 to 1, 1 to 2, 1 to 3, 1 to 4, 1 to 5; they incline more and more towards the perpendicular. The figure thus formed corresponds to the acute-angled triangle, and may become an element for the usual combinations.

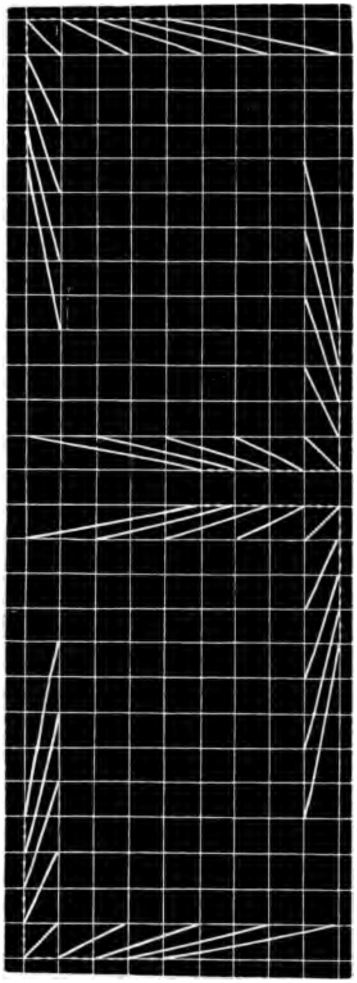


The same lines grouped to form a figure corresponding to the obtuse-angled triangle.

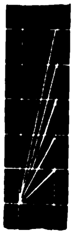


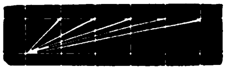


Another figure may be said to take the place of the right-angled triangle of former exercises.

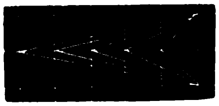


(NOTE.—Combinations may be made in the usual way with any of the above sets of elements.

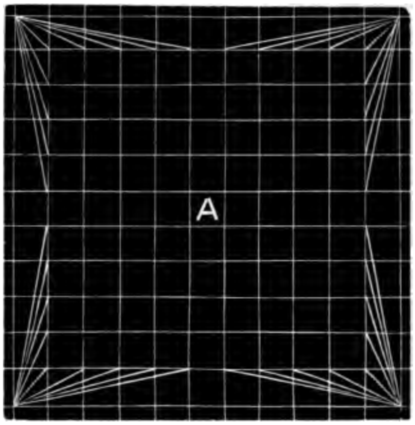


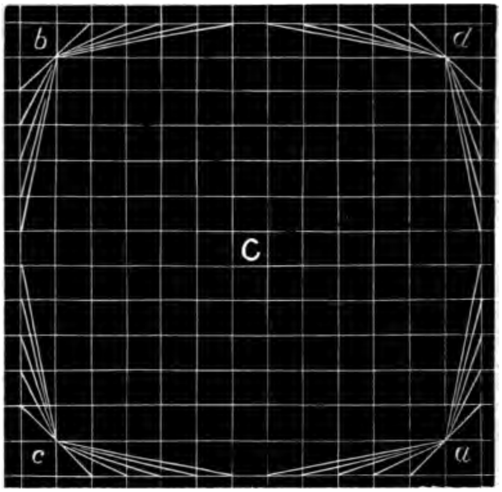


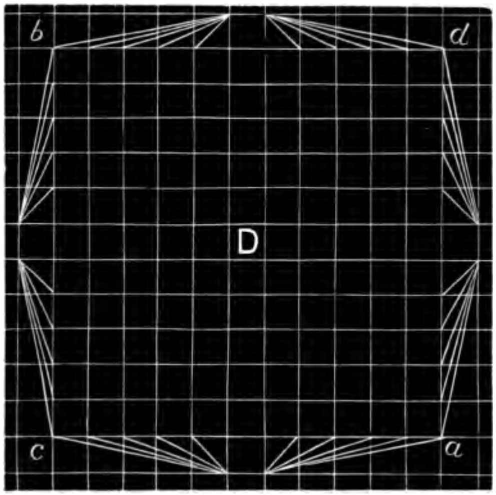
The same triangles might also be made with lines of different degrees of obliquity inclining more and more to the horizontal plane; or both sets of oblique lines may be combined to form

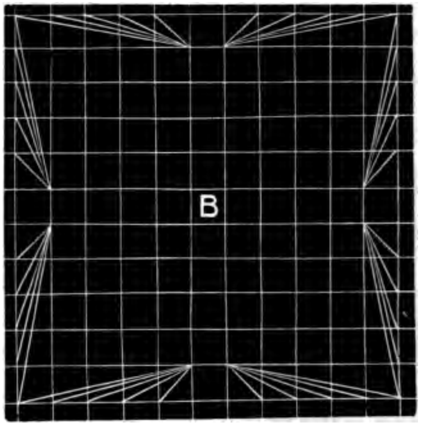


new elements: *e.g.* by making the above lines meet in *one point* we obtain new elements, and these may be combined to form another new element with which the usual combinations can be made.)



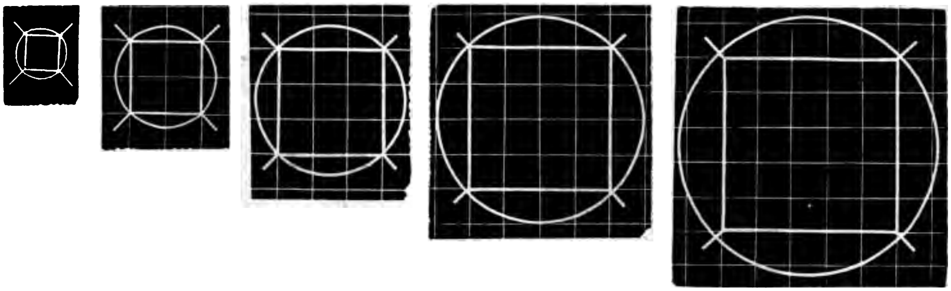






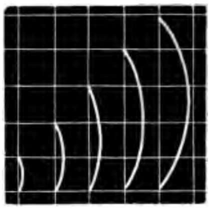
Quarter Circles.

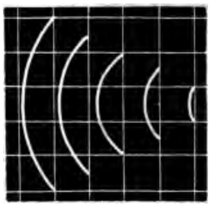
The circle may be drawn round squares of various sizes. As we drew straight lines of



various lengths before joining them to form squares, so we proceed to draw quarter circles as they lie on each side of the square, in the position indicated above.

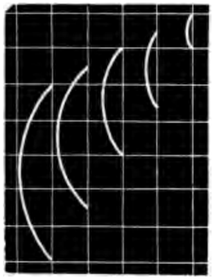
We deal with the curves as with the straight lines of various sizes; we proceed to group them in figures which correspond to the triangles in former exercises. The first figures may be

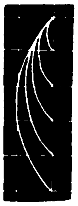


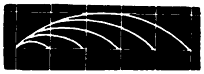


said to take the place of the right-angled triangles. They are to be considered as elements with which the usual combinations may be made.

These figures correspond to the acute-angled triangles formed by grouping the perpendicular lines; it will be remembered that two figures of that kind could only be formed.





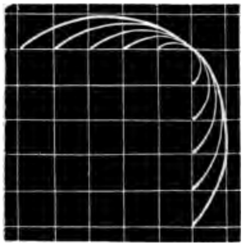


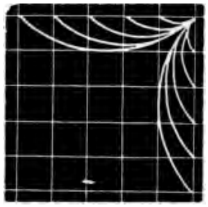
By grouping the curves (quarter circles) of 5 sizes we obtain new figures, which correspond to the obtuse-angled triangles with perpendicular lines.

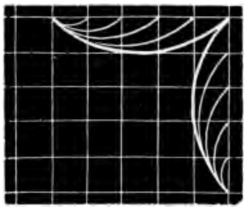
(NOTE.—What has been done with the quarter circles in a perpendicular position may be tried with those in a horizontal position.)

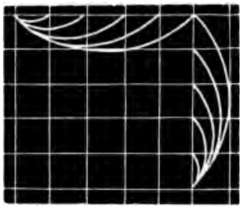
In each of these elements the five curves meet in one point. Find four in number of each.

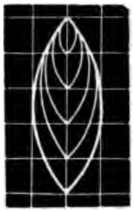
(NOTE.—The curves in the above have their convex side turned to the left or upwards; try the same exercise with curves, the convex side being turned to the right or downwards; after which try and combine these different positions of the curves in one and the same element. This may be done in a variety of ways, as the following illustrations indicate.)





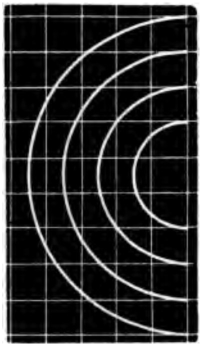






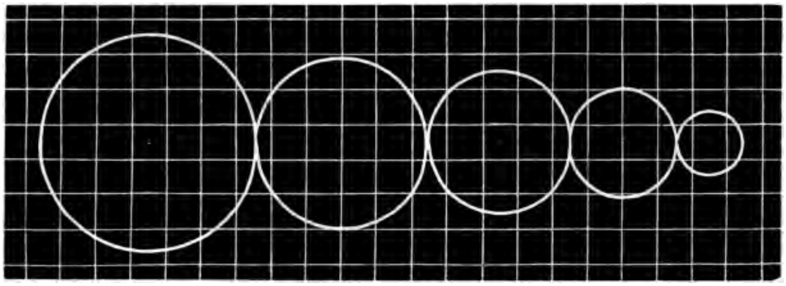
Half, Three-quarter, and Whole Circles.

The half circles of five dimensions are grouped one within the other, as in the case of the quarter circles. In Ex. 1 concave side is turned to the right in the one figure, to the left in the other. In Ex. 2 the concave side is turned upwards in one figure, downwards in the other. The supposed section might be made at any other point in the circle, when the concave side would be turned upwards and to the right, &c.

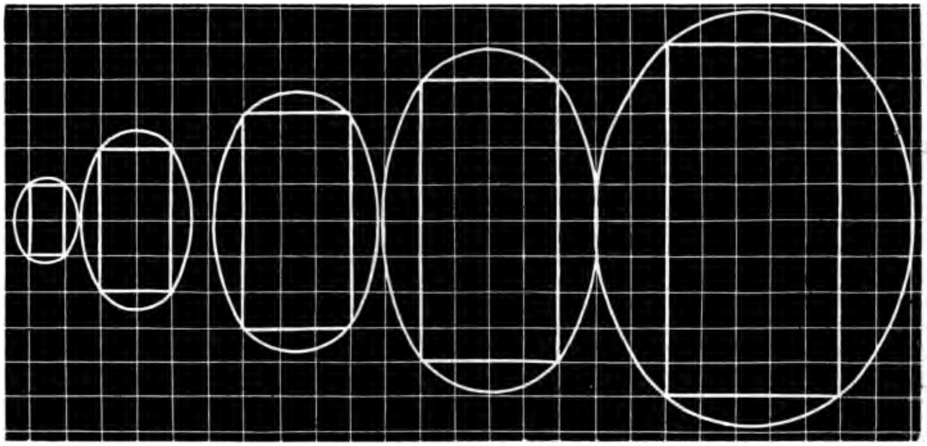


(NOTE.—The three-quarter circles of different dimensions might be dealt with in the same way.)

We proceeded from quarter to half circles, then to three-quarter circles, and finally we come to whole circles of five diameters. Figures may be made with these as with squares of five sizes (see below). The five circles may also intersect one another, or they may be drawn one within the other, &c.

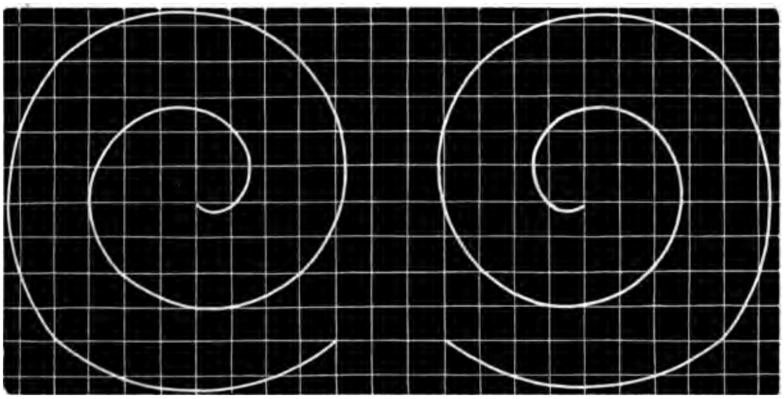


As we obtained the circle by enclosing the square, so by enclosing the oblong of five sizes we obtain the oval of different sizes.



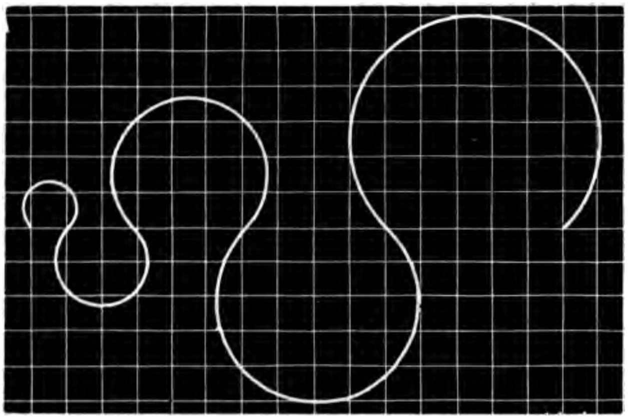
(NOTE.—Exercises with the oval as with the whole circles and squares.)

By joining quarter circles of various diameters end to end together spiral lines may be formed in different positions.



(Note.—Ditto with half circles. Any of these may be used as elements of further combinations.)

The three-quarter circles of different dimensions may be joined end to end so as to form serpentine line. This line in four positions might be variously combined.



With regard to the method of teaching these exercises, notice that during the first stage the exercises are *drawn on the chequered blackboard* and *copied* by the children on to their slates, the one side of which is ruled in the same way as the blackboard. The teacher *names* the line, according to its direction and length, and she makes, what would otherwise be rather a dry task, interesting and amusing, by using some familiar *analogy*.

In the second and third stages the blackboard should only be used for *correcting mistakes;* the exercises should be set *by word of mouth,* and might be looked upon as little *problems* to be *solved by a drawing.* They thus become a means for stimulating the thinking powers of children, and for cultivating precision in the use of words.

GROUP B.—DESIGNS.

IF we analyse any ornamental design, even the most elaborate, it resolves itself into a few *elements of form,* namely, into straight lines (in various positions and of different lengths) and curves. The *elements* are practised separately in group C, and the exercises in group B consist in *a free combination* of some of these elements to make pretty patterns. It is not sufficient for adult students to *copy* patterns designed by others, neither should we rest satisfied when our pupils copy our productions. A little practice in this direction goes a great way, and hence teachers are strongly recommended to discard the mechanical drudgery of copying for themselves as well as for their classes. As a substitute a graduated series of exercises is here given, according to which designs may be drawn. These rules may be given to children who have had some practice and instruction in drawing. Children will of course exhibit more or less aptitude in combining lines to form patterns, and the first steps will be alike difficult to all. *Now and then* a *simple* combination may be copied from the blackboard by the children; but they ought to be able to *analyse* it; they ought to draw it a second time *from memory,* or, in the case of a starform, they ought, by seeing the left half, *to imagine the right half* of the figure, &c. But all these exercises are mere expedients, they, like crutches, ought to be cast aside as soon as a pupil exhibits any self-reliance. Surely in schools for the poor this power of inventing designs ought to be cultivated, seeing that it bears so directly upon many branches of industrial art.

Try to invent a few designs (coloured chalk pencils may be used), in the following order and according to the rules here laid down.

Ex. 1.—A design composed of perpendicular lines one check in length.

Ex. 2.—Ditto, consisting of perpendicular lines from 1 to 5 checks in length.

Ex. 3.—Ditto, consisting of both perpendicular and horizontal lines from 1 to 5 checks in length. The lines must not form angles.

Ex. 4.—Ditto, as in No. 3, with this difference only, that the lines may form angles, but they must not enclose a space.

Ex. 5.—Ditto, consisting of perfectly* oblique lines from 1 to 5 checks in length. The lines may not form angles.

Ex. 6.—Ditto, as in No. 5; the lines may form angles, but may not enclose a space.

Ex. 7.—Ditto, consisting of both perpendicular and perfectly* oblique lines, length from 1 to 5 checks; the lines may not form angles.

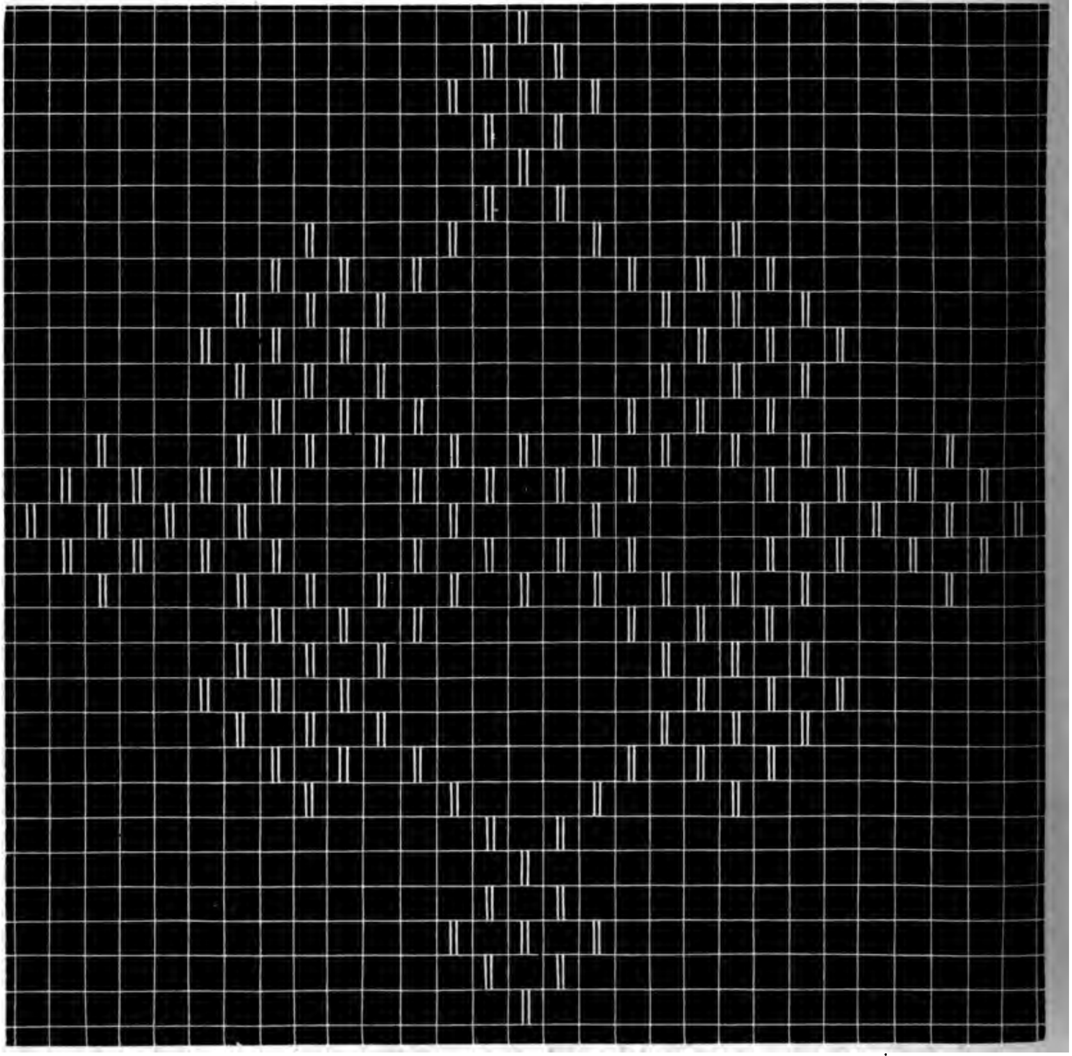
---

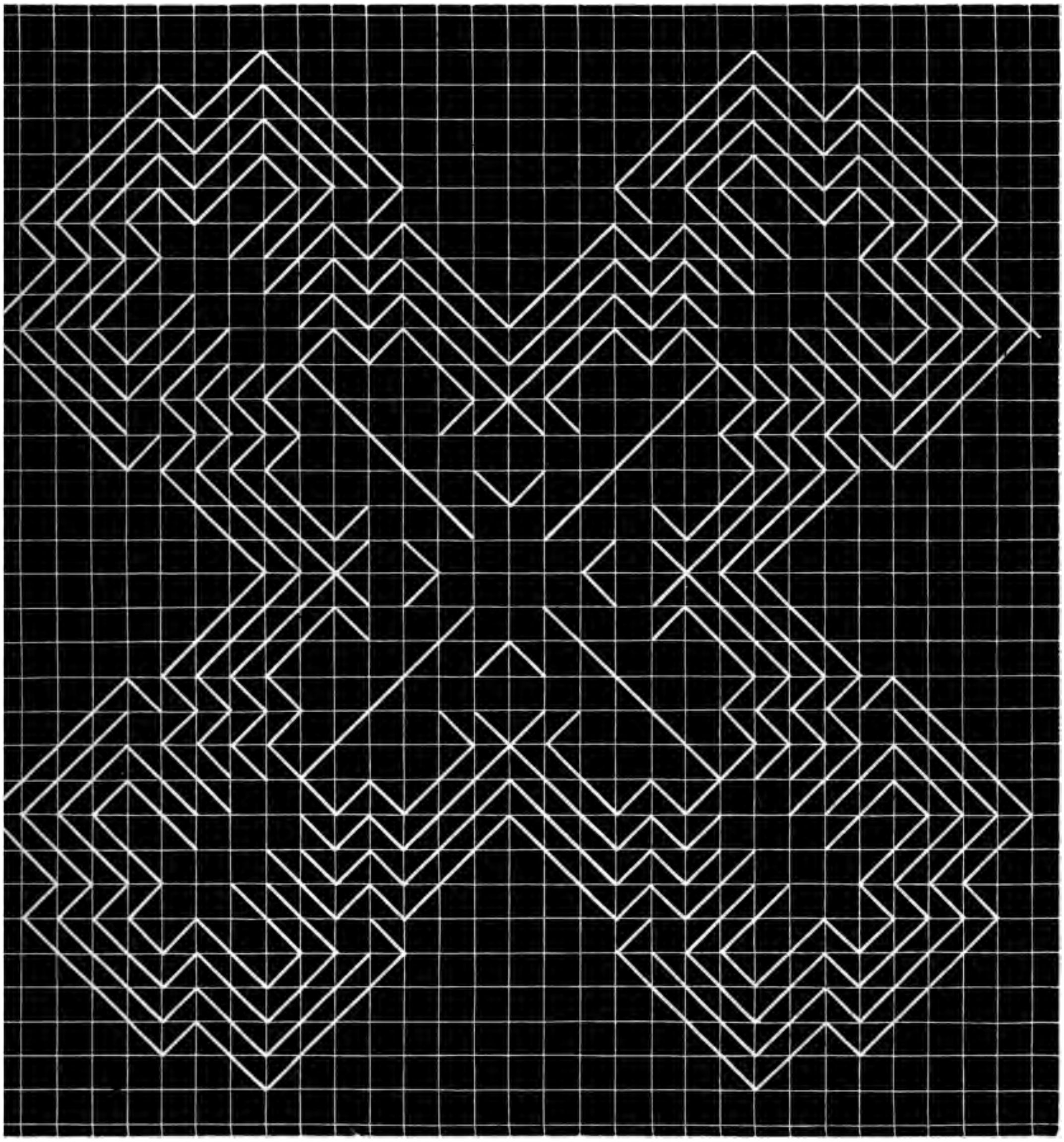
* The perfectly oblique line holds the middle between the perpendicular and horizontal lines; the semi-oblique lines incline either to the one or the other of these lines.

Ex. 8.—Ditto, as in No. 7; the lines may form angles, but may not enclose a space.

Ex. 9.—Ditto, consisting of horizontal and perfectly oblique lines, length from 1 to 5 checks; these lines may not form angles.

Ex. 10.—Ditto, as in No. 9; the lines may form angles, but may not enclose a space.





Ex. 11.—A design consisting of perpendicular, horizontal, and perfectly oblique lines.

Ex. 12.—A design consisting of semi oblique lines of all kinds, length not to exceed five checks.

Ex. 13.—A design consisting of all kinds of straight lines hitherto used, combined in various ways, but not enclosing a space.

Ex. 14.—A design consisting of right-angled triangles of five sizes; these triangles may not touch one another.

Ex. 15.—Ditto, as in No. 14; these triangles to touch, or cut one another.

Ex. 16.—The same with equilateral triangles.

Ex. 17.—The same with obtuse-angled triangles.

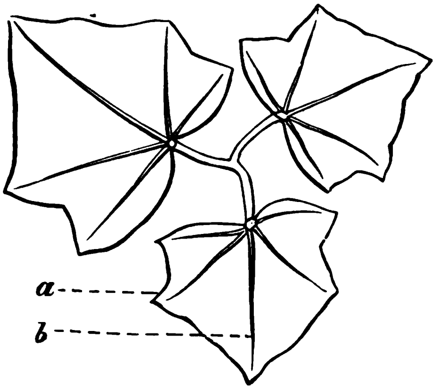
Ex. 18.—A design made up of all kinds of triangles hitherto used, of five sizes.

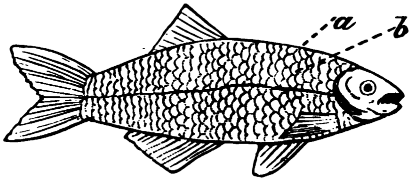
Ex. 19.—Similar exercises with other plane figures such as squares, oblongs, circles, ellipses, &c.

GROUP A.—OBJECTS.

THE aim of the exercises in this group is, to lead to free-hand drawing. The exercises are best drawn from the beginning on a surface without lines, but as children require a certain amount of guidance for the hand, the following plan may be found helpful. The objects treated of in the various lessons on natural phenomena, are drawn on cardboard* and the outlines are afterwards cut out. These models the children lay upon their slates and they draw round them. The barest outline* of an object will thus be obtained, but there will remain other lines in the model which the child must add in free-hand; *e.g.* the veins in a leaf, the eye or ear of an animal, the windows and door of a house, &c.

This plan seems to overcome two difficulties; on the one hand the child obtains the amount of help he requires, and on the other he does not rely upon it entirely, there being always some lines for him to add afterwards. The amount of help ought, of course, to decrease as the child's hand becomes steadier; thus in a Berlin Transition class the children build with their bricks the model from which they





---

* Occasionally the *real object* serves the purpose, as *e.g.* in the case of a leaf; they may also be drawn on or cut out in tin.

* See lines *a* and *b* in illustration.

draw; they first of all take the front view, later on the beginnings of perspective are taught in connection with their boxes of bricks.

EXAMPLES OF LESSONS IN DRAWING.

1ST STAGE.—EXERCISE 1, FROM GROUP C; EXERCISE 1, FROM GROUP A.

Material.—The teacher is provided with a chequered blackboard and chalk, the children with chequered slates and sharpened pencils.

Teacher. Look at your slates and tell me what you see upon them. (One child answers) Marks! (another) Lines! (another) Checks! Squares!

Teacher. You have given me so many names; let me see if I can remember them: Marks, lines, checks, squares. And yet you are all right! Let us say what Harry said just now: "I see checks on my slate." (The children utter this simultaneously, slowly, and distinctly.)

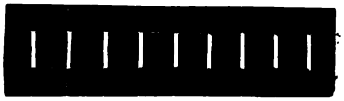
Teacher. I know a little boy, his name is Max. He goes to an infant school very like yours, and his teacher gives him a slate like yours to draw upon. Should you like to hear what he calls those little marks on his slate? (Children): Yes.

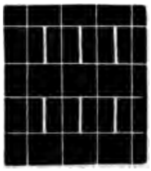
Teacher. He says, "I see little *windows* on my slate." He thinks those little checks, or squares, look so very like little window panes! (The children like the idea, and are allowed to look for "window panes" on their slates for a minute or two.)

Teacher. I should now like some child to come and look for little "window panes" on my big blackboard. (Checks are pointed out, and various things, "dots, crosses," &c., put into them.)

Teacher. I shall place an upright line by the side of one little window up here, and here another, and another, and another. Come and show me where the next little line should go, Mary. (A child advances to the blackboard, which should be lowered to the child's level.)

Teacher. Mary shall draw the line by the side of the next little window herself. Now try to begin in the same place on your slates, and to draw a *row of little lines* each by the side of a little window. (The teacher goes round and helps here and there asking a child where the next little line should be put; she will likewise check any tendency in the children to press heavily upon the pencil. When the row is accomplished she shall judge whether it is enough for one lesson. At any rate each *new row should be begun on the blackboard.* Supposing the same exercise were to be repeated another day, but with a slight variation, thus—





the teacher might draw it on the blackboard, and then say something like the following):—

Teacher. Do my little straight-up-and-down lines look like anything? (The children may or may not find any likeness.)

Teacher. Yesterday was the Lord Mayor's Show day. Many children did not come to school on that day. One boy told me he had been out with his father after it was dark. But in the street it was not dark in the least, for in every window all along the street there was something bright and beautiful. I wonder what the people *had put into their windows?* (The children suggest "candles.")

Teacher. Yes; and here is one of those little candles, or tapers. That little boy brought it in his pocket. Do you think we could make our little lines stand all in a row like little candles in the windows? (The children are delighted with the idea, and set to work according to the copy on the blackboard. It is evident that any familiar analogy like the above is necessary at this stage, and none of these exercises ought to be taught in a bald, dry way; *e.g.* the "even-along" line becomes a little "pencil" lying on the top of a check, or a "fish" swimming; the slanting lines are "boys running;" the different lengths of lines in Exercises 5, 11, 17 (see pages 121, 122) become a "family of lines," the tallest is "father," the next is "mother," &c., down to the tiny "baby." In using such analogies we should, of course, prefer those originated by children themselves, never forcing *our* ideas upon them. Sometimes, amongst children of the poor, the imaginative faculty is so weak that nothing can be elucidated from a little class; in such a case it is always best to bring in an analogy as something really thought of by *other* children. The second part of a drawing lesson would be taken up with drawing the object of the week from the cardboard model.)

2ND STAGE. — EXERCISE 1, FROM GROUP C (page 124).

Material.—As before, also every child has 5 sticks of 5 lengths.

(NOTE.—The stick-laying exercises of the 3rd stage must have preceded this drawing lesson.)

Teacher. What have I given you?

Child. You have given me a slate, sticks, and a pencil.*

Teacher. How many sticks have I given you?

Have you ever made anything on your slates that looked like sticks?

How long was the shortest line?

How long was the next longest line? And the next? And the next again? &c.

Teacher. Now look at your sticks once more. Are they all *as long as one another?*

Now I will give you each † another five sticks. Are they *all as long as one another?* (Yes.)

---

* Complete sentences are *occasionally* required, but an answer must at least be composed of *two* or *three words*.

† When the class is too numerous, the teacher uses the sticks in front of the class.

Teacher. How many *lengths* are there amongst the last five sticks? (*One* length.)

How many *lengths* are there amongst the first five sticks? (Five lengths.)

Make a heap of five sticks in which there are *two lengths.* Make a heap of five sticks in which there are *three lengths*, &c. (The last two exercises may be omitted if these have been given before.)

Teacher. Put your sticks once more into a heap. Show me things that are *standing* in this room. Name them.

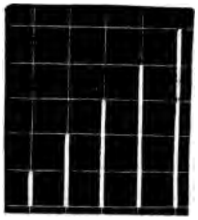
Teacher. Now lay your slates * on the table before you; point to the bottom side of the slate; what kind of line does it form?

Answer. It forms a horizontal line.

Teacher. Could you lay your sticks in a row upon the slate to make them look as if they were *standing upon that horizontal line?* Begin with the shortest stick; let the next always be a little longer than the last you laid down. With which stick *must* you end?

On which side must the shortest stick be?

On which side is the longest stick?



Name things in the room on the same side as the shortest stick?

Name things on the same side as the longest stick?

What is the *opposite* of the left?

What is the *opposite* of the right?

Look to the *opposite* of the right. To the opposite of the left.

What is the *opposite* of ("something *very* different from") the shortest stick?

What is the *opposite* of the longest stick?

Teacher. Who will come and lay my sticks in a row, as if they were *standing* upon this horizontal line? (This is done.)

If we were going to draw a picture of these sticks, what should we make on the slates? (Lines.)

How long should the line be that stands for the shortest stick?

And the line for the next longest stick? &c.

Teacher. Take up your slates and pencils, and draw a picture of my sticks, standing on a horizontal line. When it has been done many times nicely on the slate, I will give a book to those that know how to draw.

(The remainder of the lesson will be suitably spent in drawing this exercise on the slate and into the books.)

EXERCISE 2. A FIRST LESSON.

Material as before.

(NOTE.—The first questions are answered *from memory.*)

Teacher. With which stick did you begin the row when we last laid a figure with sticks?

On which side was that shortest stick?

With which stick did you end?

---

* Either a stick or a horizontal line drawn with chalk will do equally well.

The remainder of the lesson would then be taken up in drawing the object of the week.)

For the remainder of the Group C exercises of this stage, see pages 124—127; they are dealt with in a similar manner, *e.g.* in making No. 13. Nos. 2 and 8 are first laid with sticks separately, and united so as to form "a big corner;" this big corner may be laid in different positions (Nos. 14, 15, and 16). Before beginning Exercises 18, 19, 20, let the children practise drawing separate squares of different sizes. Figures 17 to 20 are compared, perhaps, to another "flight of steps." Other figures are found by placing the squares according to their size on the top of one another. All these exercises ought to be laid with sticks previous to drawing; they ought also to be *found from description*. (See remarks on teaching these exercises, page 154.)

3RD STAGE (AGE 6½ AND UPWARDS).

Material.—Chequered slates and sharpened pencils, 4 right-angled triangles (paper, pasteboard, or wood), chequered books, chequered blackboard and chalk; larger size of triangles for the teacher. The latter will find a jointed foot-rule useful.

LESSON ON THE ANGLES IN THE RIGHT-ANGLED TRIANGLE.

Teacher (knocking her hand against a corner of the table). What is this part of the table called against which we sometimes strike and hurt ourselves? Show me corners like this.

Could you, with your finger, go into the *inside* of a corner like this? Try to put your finger into another corner, and into another.

There are some corners into which we can put more than a finger; we can go into them ourselves, can't we?

Find such a corner, Harry, and go into it; go into another, &c. What would that corner be like if we were outside the house?

Answer. It would be pointed.

Teacher. Do you know another name for the corner into which we can go?

Answer. "*An angle.*" Repeat this name.

Teacher. Those little pieces of wood (paper) I gave you just now have something we have just been talking of; what is it?

Lay one of these pieces before you and put your finger into the *biggest* angle, or corner. Perhaps where there is room you may get the tip of your forefinger inside.

Teacher. Now look and see if there is an angle, or corner, into which you can only get your little finger. There is much less room there, so we call that angle the smallest. Show me another angle on that piece of wood (paper) as small as the smallest.

You have been looking at the space, or room, inside. Now look at the corners *outside*. Which looks the most pointed?

Which looks the *least* pointed?

How many are very pointed outside?

When the corner is very pointed *outside* is there much, or little, room *inside?*

Point to that angle, or corner, which

is very pointed outside, and where there is little room inside. Do you know what its name is? It is called an *acute angle.* Repeat. Point to an angle, or corner, which looks less pointed outside. Is there more room inside?

What is the name of that angle, or corner?

Teacher. Now lay all the pieces of wood in a row.

Point out all the right angles you can find on them. How many have you found?

Point out all the acute angles you can find on them. How many have you found?

Show me right angles in this room.

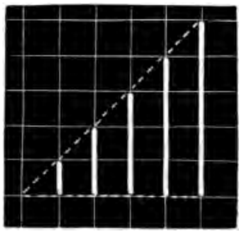
Find acute angles in the room. If our walls made an acute angle would there be room for a child to go inside?

What appearance would the acute angle have outside the house?

A SECOND LESSON ON THE SAME.

Material as before.

Teacher. Draw your five perpendicular lines of five lengths standing upon a horizontal line. Begin with the shortest line. I shall do the same on the blackboard. If I were to draw *a line round about these lines* thus (see dotted line) with chalk, how many corners, or angles, would our figure have?



What is the name of such a figure with three angles? (*triangle,* or *three-angle*).

Do you see any triangles in the room?

In the garden? (Flower-beds.)

In the street? (In laying down wood paving geometrical figures are seen.)

Are the angles all as big as one another in the triangle you have drawn?

Which is the biggest?

What is its name?

What are the others called?

Why?

Now, tell me what kinds of angles we have in this triangle?

Does the right-angle lie at the top or at the bottom of the triangle? (It lies at the bottom.)

Does it lie at the right side or at the left side? (It lies somewhat to the right.)

Where does the right angle lie exactly?

Answer. The right angle of this triangle lies to the bottom, right of the figure.

Teacher. What kind of lines meet to make the right angle?

On which side is the perpendicular line?

Where is the horizontal line?

How many lines meeting make a right angle?

Now take another of your wooden (paper) triangles and lay it so before you that the right angle shall lie to the *bottom, left* of the figure.

Take your slates and arrange the five lines in such a way as to form a triangle in the same position on the slate.

(NOTE.—The triangles with the right angles lying to the top right and top left are previously illustrated by means of wooden (paper) triangles, after the same manner. When these four triangles have been separately drawn, they become the elements which are combined in the next exercise.)

LESSON ON FIGURE A.

(See page 128.)

Material as before.

Teacher. How many lines *go round*, or enclose, the figure we called a triangle?

How many lines must we have, therefore, in four triangles?

How many lines formed one right angle of the triangle?

How many lines forming right angles have we in four triangles?

What kind of lines were they? (Perpendicular or horizontal lines.)

Now we call those two lines which enclose or contain our right angle here the "legs" of that angle. Is that not a funny name? I shall whiten the "legs" of this right angle in the triangle that you may see them distinctly. (This is done with chalk.)

How many "legs" has a right angle?

Two right angles have how many legs?

Three right angles* have how many?

Teacher. Now take your four wooden (paper) triangles and try to put them together, so as to make a figure, in which the right angles lie in the centre of the figure. (This is found.)

Teacher. How many right angles are in the centre?

How many legs of right angles lie within the figure?

What kinds of lines are they? (Perpendicular and horizontal lines.)

Draw this figure into your books. (The spaces must be counted so as to find the centre of the page, and the figure ought to be drawn from the centre outwards.)

A LESSON ON THE INTERMEDIATE FORM C. (See page 128.)

Material as before.

Teacher. The figures A and B were so very different from one another that we called them by what name? (Opposites.)

Tell me in what way they differed from one another. (*Answer.* In A the right angles lay in the centre, in B they lay on the circumference. In A the legs of the right angles lay within, in B they lay without.)

Could you find another figure in which each right angle lies half inside and half outside?

Four perpendicular legs of right angles are within the figure, thus it has the half of A and the half of B in it.

Teacher. How many legs of right angles have we altogether?

What is the half of that number?

Teacher. How many legs of right angles lie on the circumference of the figure? Which are they? Draw this figure with lines into your books.

---

* It is necessary here to confine the children's attention to the limits of the right angles, otherwise the same remarks would have been extended to the remaining angles in the triangle.

A LESSON PREPARATORY TO DRAWING FIGURES E AND F. (See page 129.)

Material as before.

Teacher. (After repeating former lessons on the intermediate forms.) What number of lines have we to think of in connection with the right angles in our triangles?

What proportion of (or part of) that number lay on the circumference? What proportion lay inside in the figures C and D?

Try to find a figure in which two legs (horizontal) of the right angles lie on the circumference and the remaining six within the figure.

Teacher. How many right angles are entirely within the figure?

What is the position of the others?

How many legs of right angles lie within the figure?

What kind of lines are they?

How many legs lie on the circumference of the figure?

What kind of lines are they?

How much of the whole number of legs lies inside?

How much is outside.

NOTE.—The above questions indicate how the following exercises of this group are developed. The whole course is worked out according to the law of antithesis, as the letterpress describing each exercise will show (see pages 128—154).

PRICKING.

PRICKING is another kind of drawing, or tracing lines with points. The material necessary for this occupation is as follows:—A pricker, or needle, the end of which is inserted into a piece of wood to serve for a holder, chequered paper, and white drawing-paper, a piece of felt or cloth. The paper is laid on the top of the felt (which ought always to be a size larger), and is punctured, care being taken to insert the pricker perpendicularly into the surface of the paper.

This occupation should be reserved for children 5½ to 6 years of age for obvious reasons; in the first place danger is incurred in the use of the needle, also greater precision is necessary to touch the comparatively small surface of the paper occupied by the point of the needle, so that pricking is, as it were, a constant practice in *taking aim.*

The exercises in pricking fall under the threefold division, adopted in most of the occupations, namely:—

Group A.—Objects.*

Group B.—Designs, or patterns.

Group C.—Geometrical exercises.

With regard to the objects, it is evident that they should be those handled in object lessons. In the more advanced exercises in object pricking two needles, one coarser, the other finer, are used; the coarser needle is used for the outline and main lines (for the veins in a leaf, *e.g.*); these are pricked on the right side of the picture, after which it is turned, and the shading is indicated with the finer needle on the wrong side.

---

* These should be in close connection with the object selected for the month. See Frontispiece.

The exercises designed to develop certain simple ideas of Form (Group C) are pricked on chequered paper cut into oblong pieces, of a size convenient to the child's hand. The following graduated series is designed to convey the instruction given in a marginal note alongside of each exercise.

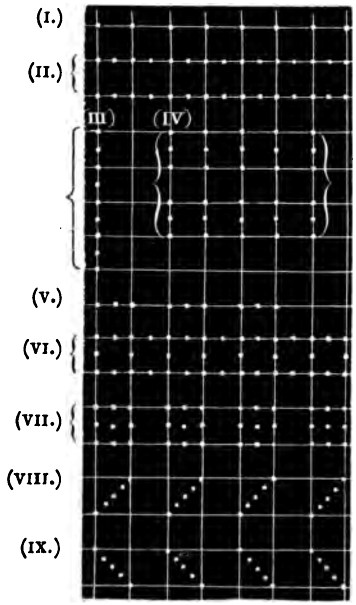
GROUP C.

1*st Stage.*

PRICKING EXERCISES.

Lessons to be Conveyed.

(I.) *Points* are at the ends of lines, or where lines cut one another.



(II.) *The horizontal (pricked) line* (this is formed by pricking points half way between two given points).

(III.) *The perpendicular (pricked) line* (length indefinite).

(IV.) *The perpendicular (pricked) line* (length determined).

(V.) *The horizontal (pricked) line* (length determined).

(VI.) *Squares* formed by lines in (IV.) and (V.); *corners*, position, name, number.

(VII.) *The centre of the square.*

(VIII.) *The oblique line* passing through the centre from corner to corner of the square.

(IX.) As in VIII., contrary direction.

2nd Stage.

(I.) *Semi-oblique lines* inclining towards the horizontal line.

(II.) Ditto, ditto, opposite direction.

(III.) *Semi-oblique lines* inclining towards the perpendicular.

(IV.) Ditto, ditto, opposite direction.

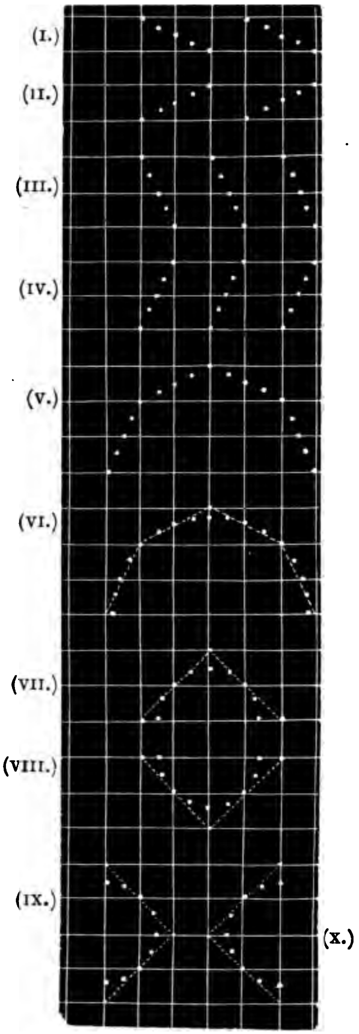
(V.) *The semi-oblique lines* inclining to the perpendicular, and those inclining towards the horizontal line are joined. They nearly describe the *half-circle*, which is obtained by lowering the highest point and moving the end points inwards.

(VI.) *The large half-circle* formed by the semi-oblique lines. The same proportions may be found by modifying the incline of the oblique lines in exercises VIII. and IX. of the 1st Stage, and thus we get in exercise

(VII.) *The smaller half-circle* (the convex side being turned upwards).

(VIII.) Ditto, the convex side turned downwards.

(IX.) and (X.) Ditto, the convex side is turned to the right and left.



The exercises in Group B are *combinations* of the different lines considered *separately* in the geometrical group; these should not be set as *copies*, but should be inventions of the children themselves. The teacher may stimulate the power by limiting the class to the use of certain lines at a time, by suggesting that two exercises once done on separate papers might, when pricked on *one and the same paper*, make a pretty design.

General Remarks on Teaching this Occupation.

The threefold grouping of the exercises adopted must of course undergo a cross division for the purposes of teaching. It is advisable, therefore, to begin a lesson in pricking with an exercise from Group C and to end off with an exercise from one of the other two groups. A first lesson in pricking may be supposed to take the following course.

1st Lesson in Pricking.

Material. — Chequered blackboard, chalk; every child has a pricker, a piece of chequered paper, and a piece of felt.

(Note.—If the children have no ideas concerning horizontal and perpendicular lines from other occupations, it would be necessary to preface the pricking lesson by some questions like the following.)

Teacher. What do you see on your papers?

Answer. I see blue lines on my paper.*

Teacher. What do you see on my blackboard?

---

* Complete sentences ought to be insisted upon if the children are six years old.

Come and show me a red line on my blackboard, Harry.

Show me where that red line begins.

Where does it end?

At which side of the blackboard does it begin?

At which side does the red line end?

What name do we give to lines that run from the left side to the right side without a bend?

Draw such a line with your finger through the air from left to right.

Show me other horizontal (lying-down) lines on the blackboard.

Draw your finger along one of these.

Teacher. Did your finger meet anything by the way?

Answer. Yes, another line.

Teacher. Where did your line meet another line?

Where again?

And again?

Teacher. I shall take my chalk and *mark these places where your horizontal (lying-down) line meets another line.*

(The teacher makes the pattern.)

What have I made?

Answer. Dots! Points! Full stops!

Teacher. Quite right. Let us call them *points.* Where are these points to be made?

Answer. Where the lines meet there are points (or where the lines *cross,* or *cut* one another).

Teacher. You cannot let your finger run along the blue horizontal (lying-down) lines on your paper, but you can allow the fine point of your prickers to take the journey. Hold them thus in your right hands ready to begin. (Position shown.)

Along which line shall the pricker begin to take its journey? (Along the first (lying-down) horizontal line.) *Whenever it meets a line it must make a point.* (The teacher meanwhile goes round to make sure that every child understands what he has to do. At the end of the first line a halt is made, the prickers are raised in the air, until permission is given to begin the next line. No invention or object can as yet be pricked by the children.)

Lesson on Exercise 4.*

Material as before.

Teacher. What is the name for those lines running from the top to the bottom of the blackboard?

Have you pricked such lines?

But supposing we wanted to prick a (*straight-up-and-down*) perpendicular line that was not so long as any we have yet pricked; supposing we were to prick one that was as long as the first square at the top left corner of our paper: where should we begin?

Where should we end that line?

Take your prickers and make a prick at *the top of the line;* make a prick at the *bottom of the line;* make a prick *in the middle* between the two pricks. Lay down your prickers. Look at the back of your papers.

What kind of a pricked line have you made?

How long is it?

Turn your papers once again. Take up your prickers and make two more little (straight-up-and-down) perpendicular lines of one check in length, in the same row. Finish the row of little perpendicular (straight-up-and-down) lines and hold up your pricker.

---

* See page 168.

(The teacher draws the most common mistakes and gets the children to correct them on the blackboard. The second row is begun simultaneously.)

Lesson on Exercise VII.*

Material as before.

Teacher (making a mark of some kind within one of the squares on the surface of the blackboard). What have I done?

Where have I placed my dot, or point, on the blackboard? (Within a check or square.)

Do you think the point I have made looks *nearer the top, or the bottom* of the square?

Let us measure. (One child measures and a mark is made with chalk on the yard measure. The distance is the same between the top and bottom.)

Teacher. Well, is the point nearer the left side or the right side? (Another child measures and finds the distance to be the same.)

Answer. The point is as far from the top as from the bottom of the square; the point is as far from the left as from the right side of the square.

Teacher. When the point *is as far from the one side as the other, all round,* what do we call it?

Make a point in a square on the board that shall be near the left side of the square.

Would that point do for the *middle point?*

Why not?

Now take up your prickers and prick the *middle point* of the first square.

Leave a square and prick the *middle point* of the next square, &c.

2nd Stage.

Lesson on Exercise I. (semi-oblique lines).

Material as before, chequered slates for Inventions.

Teacher. Let me see if you can remember all the different kinds of lines we have pricked on our papers. Come and draw them on the blackboard.

Name these. | —— \

Can you remember any other oblique line?

Can you think of a new perpendicular line?

Try and make another.

Can you make a new horizontal line? (This is tried by several children on the blackboard.)

Perhaps you may be able to find a new oblique line.

Through how many squares does this oblique line go? (Through one square.)

Could you make one that shall go *through two squares?* (This is tried on the blackboard.)

Begin at the *top right corner* of the square.

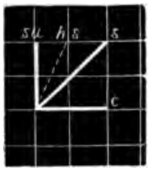
Now make dots or points on the blackboard where you are going to *prick* the line.

Teacher. Now draw a (straight-up-and-down) perpendicular and a (lying-down) horizontal line, each two squares long, meeting the (slanting) oblique line.

---

* See page 168.

Teacher. Is the (slanting) oblique line nearer the (lying-down) horizontal, or nearer the perpendicular (straight-up-and-down) line? (The distance is measured by a child.)



Who could draw a (slanting) oblique line nearer the perpendicular (straight-up-and-down) line than the one we have. (See dotted line.)

Teacher (*effacing the first oblique line made*). Some one must come and measure the space between the lines now. (The oblique line is now clearly seen to be nearer the perpendicular line.)

Teacher. Through how many squares does this new (slanting) oblique line go?

How are these squares placed with reference to one another?

Answer. The two squares are *over* one another.

Teacher. Draw another (slanting) oblique line, running through two squares placed *over* one another.

Now make dots on the line where the pricks or points ought to be made.

Draw another such line on the blackboard.

And another.

Teacher. We call such an oblique line *half-oblique* (*half-slanting*).

Take up your pencils and make dots, or points, where the pricks are to be made on your papers.

Now take your prickers and prick one *half-oblique* (*half-slanting*) line.

(The exercise is continued for some time.)

2nd Part.—The object of the children's care and interest for some weeks past has, perhaps, been *The Strawberry*. A simple outline drawing of the plant may in that case be shown. A few words remind the children of what they have learnt, and the object is traced with the pricker. The older children may be expected to do the fruit in raised pricking.

SEWING.

THE material necessary for the above occupation is — perforated cartridge paper of the consistency of drawing paper (it is cut into oblong pieces of a size convenient for the child to hold), a wool needle, and fine coloured wools or silks. These exercises are the best possible preparation which young children can have for future instruction in needlework; they learn to manipulate with the needle without having any severe mechanical strain put upon them at a tender age. The exercises are dominated by the ideas of form by the object lessons; the manual labour is thus lifted out of the region of mechanical drudgery, and is sustained by the association of ideas by the interest excited in the children.

The exercises may be divided, as in other occupations, into the usual three groups.

Group C. — Elements of patterns (ideas on lines, &c.).

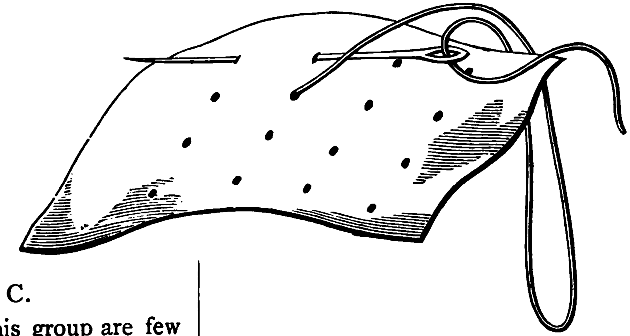
Group B. — Combinations to form patterns.

Group A. — Objects (used only in connection with the object treated during the month).

GROUP C.

The exercises in this group are few and simple, the idea being that they should be regulated *according to the position of the needle.* The lines formed at the *back* of the card are of chief importance, as these necessarily indicate the position in which the needle has been held; the pattern in front is considered afterwards. Hence in the examples on the following pages both sides of the card are represented.

The child receives a perforated piece of cartridge paper; the threaded needle is already drawn through the first hole to the front, and is left sticking in the paper, say, in a *horizontal* position, thus—



He is taught to keep the needle in this position each time he makes a stitch, keeping the needle and thread in front of the card. He finds the lines will be horizontal on the wrong side, whilst they are perpendicular on the right (see Ex. 1 on next page).

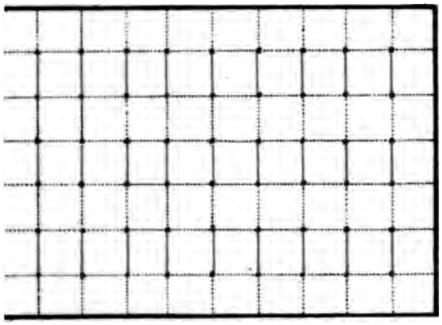
The exercises of Group B (see the last of following pages) are done after the same manner.

SEWING.

ELEMENTS OF PATTERNS.

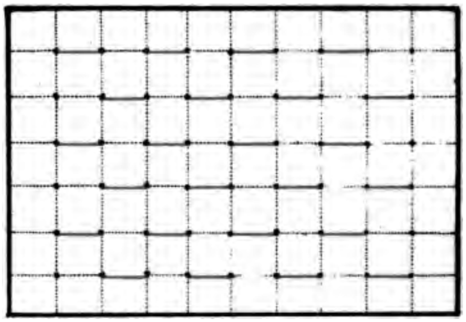
Position of the Needle—horizontal.

FRONT VIEW.

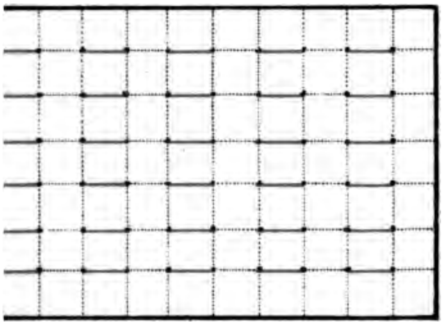


EXERCISE 1.

BACK VIEW

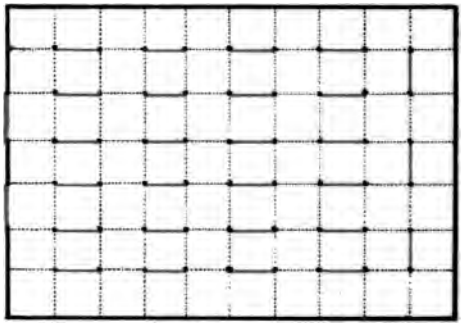


FRONT VIEW.

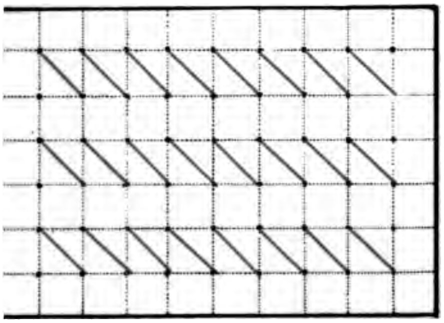


EXERCISE 2.

BACK VIEW.

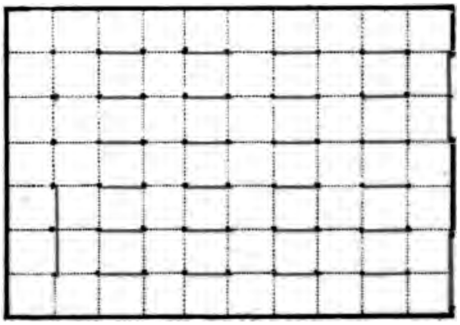


FRONT VIEW.



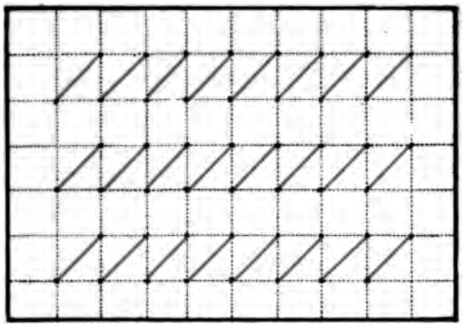
EXERCISE 3.

BACK VIEW.



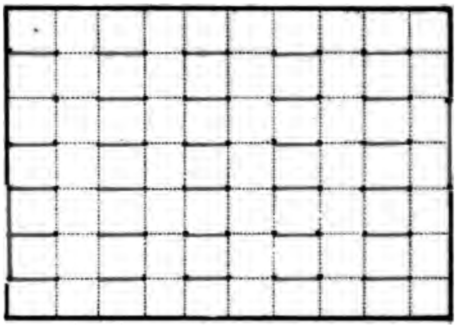
Position of the Needle—horizontal.

FRONT VIEW.

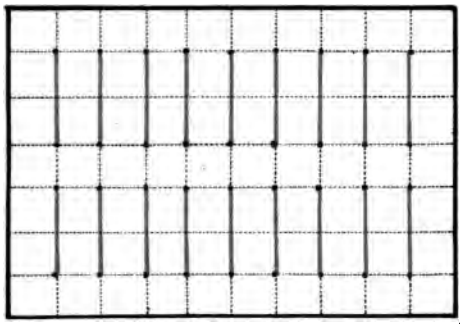


EXERCISE 4.

BACK VIEW.

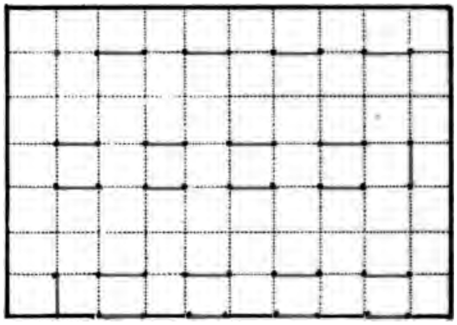


FRONT VIEW.

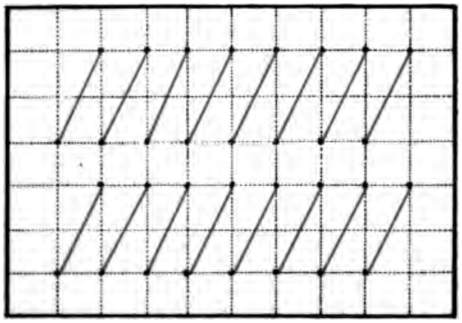


EXERCISE 5.

BACK VIEW.

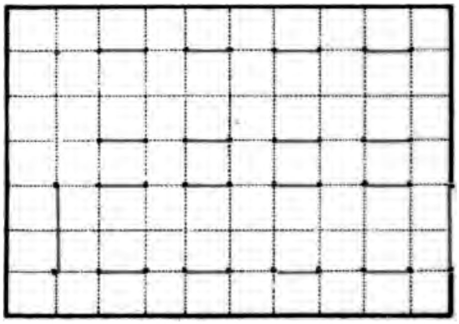


FRONT VIEW.



EXERCISE 6.

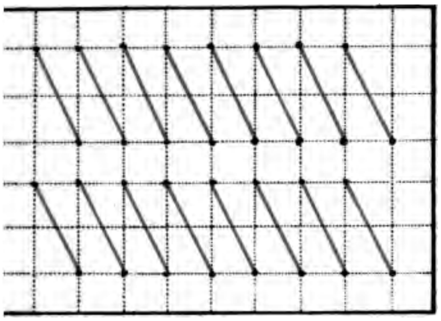
BACK VIEW.



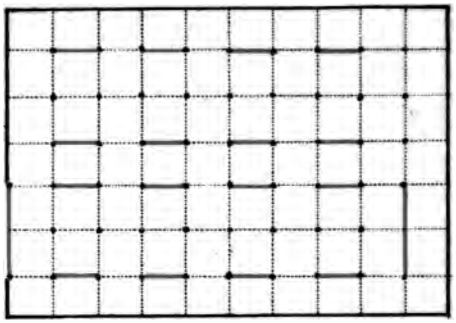
Position of the Needle—horizontal.

EXERCISE 7.

FRONT VIEW.

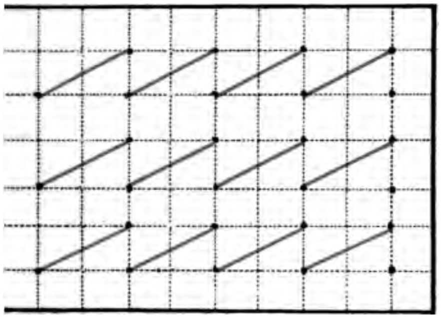


BACK VIEW.

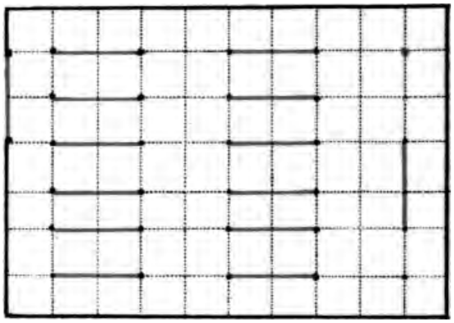


EXERCISE 8.

FRONT VIEW.

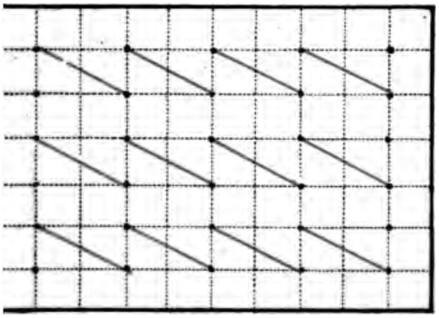


BACK VIEW.

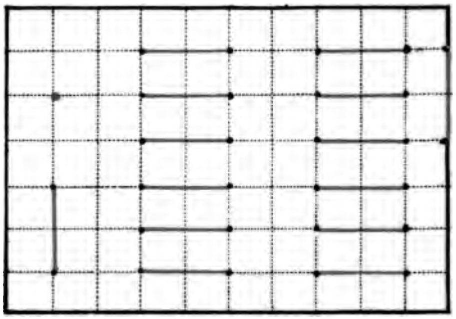


EXERCISE 9

FRONT VIEW.



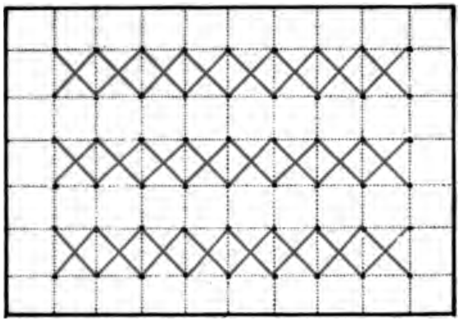
BACK VIEW.



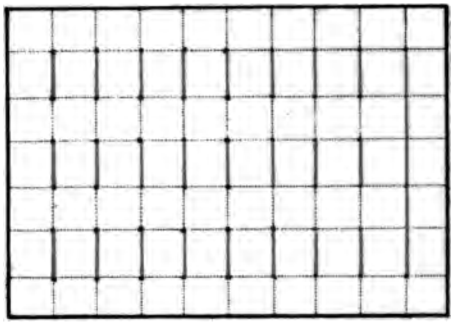
GROUP B. COMBINATIONS.

Showing one position of the Needle (see back view).

FRONT VIEW.

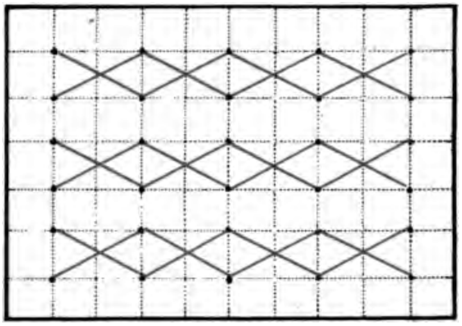


BACK VIEW.

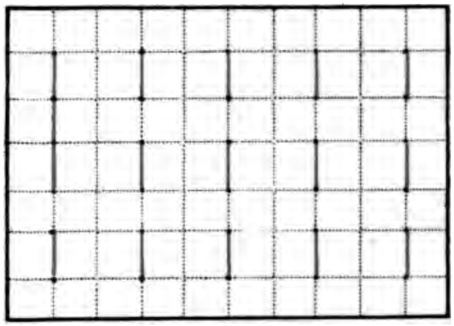


Nº 1.

FRONT VIEW.

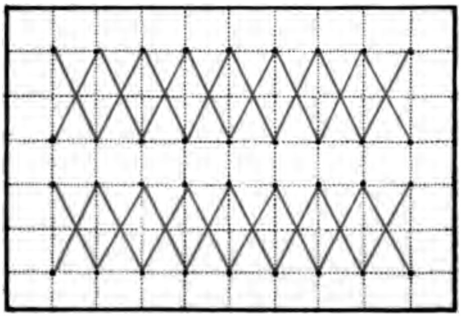


BACK VIEW.

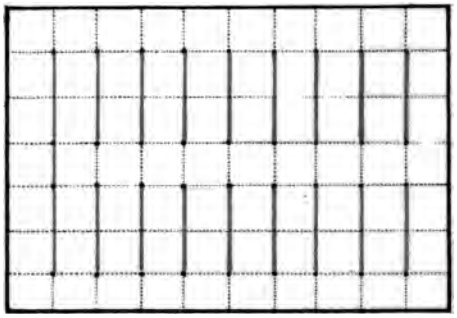


Nº 2.

FRONT VIEW.



BACK VIEW.



Nº 3.

NOTE.—The same exercises may be repeated, changing the position of the needle to the perpendicular, after which it may be held obliquely; in each case *the front* of the card is the same, but the pattern at the back shows perpendicular or oblique lines.